H1173

0055470

Date: 15 March 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF Leachate Delisting Analysis
Subject: Semivolatiles - Data Package No. H1173-LVI (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-LVI prepared by Lionville Laboratory Incorporated (LVI). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/4/00	Water	C	See note 1 & 2
B110B3	12/4/00	Water	C	See note 1 & 2
B110B3R	12/4/00	Water	C	A re-analysis of sample B110B3 outside holding time.

1 - Semivolatiles by EPA 8270C (add-ons O,O,O-Triethylphosphorothioate; 1,4-dinitrobenzene, 1-acetyl-2-thiourea, 2,5-diaminotoluene and cyclohexyl-4,6-dinitrophenol were requested and a spectral search was conducted for all).
2 - PAHs by 8310.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as

follows: Water samples must be extracted within 7 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the extraction holding time being exceeded by greater than four times the limit, all detected semi-volatile results in sample B110B3R were rejected and flagged "R" and all non-detected results were qualified as estimates and flagged "J".

Due to the holding time being exceeded by less than twice the limit, all PAH results were qualified as estimates and flagged "J".

All other holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

See surrogate recovery section.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike/matrix spike duplicate analysis, all PAH results were qualified as estimates and flagged "J".

See the surrogate recovery section below.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to surrogate recoveries below 10% in sample B110B2 and the matrix spike associated with samples B110B2 and B110B3, combined with matrix spike recoveries below 10% for all spiked compounds, all semi-volatile results in samples B110B2 and B110B3 were rejected and flagged "R".

Due to the combination of greatly exceeded holding times, low sample and QC sample (matrix spike and method blank) surrogate recoveries and matrix spike percent recoveries, all semi-volatile results in sample B110B3R were rejected and flagged "R".

Due to surrogate recoveries outside QC limits, all PAH results were qualified as estimates and flagged "J".

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-20%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Semi-volatile matrix spike/matrix spike duplicate RPDs were not calculated due to the rejection of all semi-volatile data and the lack of a matrix spike/matrix spike duplicate for PAH.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to LVI for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for semi-volatile duplicate results was not calculated due to rejection of all semi-volatile data. All PAH field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the project quantitation levels (PQLs) to ensure that laboratory detection levels meet the required criteria. Fifty-two (52) semi-volatile analytes had detection levels above the PQL (see pages 11-15) as well as the PAHs dibenzo(a,h)anthracene, benzo(a)pyrene, chrysene, benzo(k)fluoranthrene, benzo(a)anthracene and indeno(1,2,3-cd)pyrene. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package No. H1173-LVI (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 9%.

MAJOR DEFICIENCIES

Due to surrogate recoveries below 10% in sample B110B2 and the matrix spike associated with samples B110B2 and B110B3, combined with matrix spike recoveries below 10% for all spiked compounds, all semi-volatile results in samples B110B2 and B110B3 were rejected and flagged "R". Due to the combination of greatly exceeded holding times, low sample and QC sample (matrix spike and method blank) surrogate recoveries and matrix spike percent recoveries, all semi-volatile results in sample B110B3R were rejected and flagged "R". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

Due to the extraction holding time being exceeded by greater than four times the limit, all non-detected results were qualified as estimates and flagged "J". Due to the holding time being exceeded by less than twice the limit, all PAH results were qualified as estimates and flagged "J". Due to surrogate recoveries outside QC limits, all PAH results were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Fifty-two (52) semi-volatile analytes had detection levels above the PQL/CRQL (see pages 11-15) as well as the PAHs dibenzo(a,h)anthracene, benzo(a)pyrene, chrysene, benzo(k)fluoranthrene, benzo(a)anthracene and indeno(1,2,3-cd)pyrene. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE *Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary*, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Semivolatiles	R	All	Low surrogate recoveries, matrix spike recoveries
Semivolatiles	UJ	B110B3R	Holding time
PAH	J	All	Holding times, no MS/MSD analysis, surrogate recoveries

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE/PAH ANALYSIS, WATER MATRIX, (UG/L) Page__1__ of__5__

Project: BECHTEL-HANFORD															
Laboratory: RECRA LabNet															
Case:	SDG: H1173														
Sample Number		B110B2		B110B3		B110B3									
Remarks				Duplicate		Re-analysis									
Sample Date		12/4/00		12/4/00		12/4/00									
Extraction Date		12/8/00		12/8/00		1/3/01									
Analysis Date		12/26/00		12/26/00		1/22/01									
Semivolatile (8270C)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol*	0.42	10	UR	10	UR	10	UR								
bis(2-Chloroethyl)ether*	1.5	10	UR	10	UR	10	UR								
2-Chlorophenol*	1.2	10	UR	10	UR	10	UR								
1,3-Dichlorobenzene*	1.3	10	UR	10	UR	10	UR								
1,4-Dichlorobenzene*	5	10	UR	10	UR	10	UR								
Benzyl Alcohol		10	UR	10	UR	10	UR								
1,2-Dichlorobenzene*	1.2	10	UR	10	UR	10	UR								
2-Methylphenol		10	UR	10	UR	10	UR								
bis(2-Chloroisopropyl)ether*	2	10	UR	10	UR	10	UR								
4-Methylphenol		10	UR	10	UR	10	UR								
N-Nitroso-di-n-propylamine*	1.8	10	UR	10	UR	10	UR								
Hexachloroethane*	0.98	10	UR	10	UR	10	UR								
Nitrobenzene*	1.2	10	UR	10	UR	10	UR								
Isophorone*	1.4	10	UR	10	UR	10	UR								
2-Nitrophenol	10	10	UR	10	UR	10	UR								
2,4-Dimethylphenol*	0.79	10	UR	10	UR	10	UR								
Benzoic acid		26	UR	26	UR	26	UR								
bis(2-Chloroethoxy)methane*	1.6	10	UR	10	UR	10	UR								
2,4-Dichlorophenol*	1.2	10	UR	10	UR	10	UR								
1,2,4-Trichlorobenzene*	1.1	10	UR	10	UR	10	UR								
Naphthalene*	0.3	10	UR	10	UR	10	UR								
4-Chloroaniline	10	10	UR	10	UR	10	UR								
Hexachlorobutadiene*	0.89	10	UR	10	UR	10	UR								
4-Chloro-3-methylphenol*	1.1	10	UR	10	UR	10	UR								
2-Methylnaphthalene	10	10	UR	10	UR	10	UR								
Hexachlorocyclopentadiene	10	10	UR	10	UR	10	UR								
2,4,6-Trichlorophenol*	1.2	10	UR	10	UR	10	UR								
2,4,5-Trichlorophenol*	0.76	26	UR	26	UR	26	UR								
2-Chloronaphthalene*	1.4	10	UR	10	UR	10	UR								
2-Nitroaniline	25	26	UR	26	UR	26	UR								
Dimethylphthalate*	1.3	10	UR	10	UR	10	UR								
Acenaphthylene	10	10	UR	10	UR	10	UR								
2,6-Dinitrotoluene	10	10	UR	10	UR	10	UR								

F0004

* - The reported detection limit is above the PQL/CRQL

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

SEMIVOLATILE/PAH ANALYSIS, WATER MATRIX, (UG/L)

Project: BECHTEL-HANFORD															
Laboratory: RECRA LabNet															
Case:	SDG: H1173														
Sample Number		B110B2		B110B3		B110B3									
Remarks				Duplicate		Re-analysis									
Sample Date		12/4/00		12/4/00		12/4/00									
Extraction Date		12/8/00		12/8/00		1/3/01									
Analysis Date		12/26/00		12/26/00		1/22/01									
Semivolatile (8270C)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline	25	26	UR	26	UR	26	UR								
Acenaphthene*	0.5	10	UR	10	UR	10	UR								
2,4-Dinitrophenol*	2.3	26	UR	26	UR	26	UR								
4-Nitrophenol*	2.1	26	UR	26	UR	26	UR								
Dibenzofuran	10	10	UR	10	UR	10	UR								
2,4-Dinitrotoluene	10	10	UR	10	UR	10	UR								
Diethylphthalate*	1.6	10	UR	10	UR	10	UR								
4-Chlorophenyl-phenyl ether	10	10	UR	10	UR	10	UR								
Fluorene*	0.3	10	UR	10	UR	10	UR								
4-Nitroaniline	25	26	UR	26	UR	26	UR								
4,6-Dinitro-2-methylphenol	25	26	UR	26	UR	26	UR								
N-Nitrosodiphenylamine*	1.5	10	UR	10	UR	10	UR								
4-Bromophenyl-phenyl ether*	1.9	10	UR	10	UR	10	UR								
Hexachlorobenzene	10	10	UR	10	UR	10	UR								
Pentachlorophenol*	16	26	UR	26	UR	26	UR								
Phenanthrene	10	10	UR	10	UR	10	UR								
Anthracene*	0.5	10	UR	10	UR	10	UR								
Di-n-butylphthalate	1.6	10	UR	10	UR	10	UR								
Fluoranthene*	0.3	10	UR	10	UR	10	UR								
Pyrene*	0.3	10	UR	10	UR	10	UR								
Butylbenzylphthalate*	2.2	10	UR	10	UR	10	UR								
3,3'-Dichlorobenzidine	10	10	UR	10	UR	10	UR								
Benzo(a)anthracene*	0.1	10	UR	10	UR	10	UR								
Chrysene*	0.1	10	UR	10	UR	10	UR								
bis(2-Ethylhexyl)phthalate*	2.9	10	UR	10	UR	5	R								
Di-n-octylphthalate*	1.8	10	UR	10	UR	10	UR								
Benzo(b)fluoranthene*	0.06	10	UR	10	UR	10	UR								
Benzo(k)fluoranthene*	0.2	10	UR	10	UR	10	UR								
Benzo(a)pyrene*	0.05	10	UR	10	UR	10	UR								
Indeno(1,2,3-cd)pyrene*	0.1	10	UR	10	UR	10	UR								
Dibenz(a,h)anthracene*	0.05	10	UR	10	UR	10	UR								
Benzo(g,h,i)perylene	10	10	UR	10	UR	10	UR								

* - The reported detection limit is above the PQL/CRQL

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Project: BECHTEL-HANFORD															
Laboratory: RECRA LabNet															
Case:	SDG: H1173														
Sample Number		B110B2		B110B3		B110B3									
Remarks				Duplicate		Re-analysis									
Sample Date		12/4/00		12/4/00		12/4/00									
Extraction Date		12/8/00		12/8/00		1/3/01									
Analysis Date		12/26/00		12/26/00		1/22/01									
Semivolatile (8270C)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,4-Dioxane	10	10	UR	10	UR	10	UR								
Methyl methacrylate		10	UR	10	UR	10	UR								
Pyridine*	0.96	10	UR	10	UR	10	UR								
N-Nitrosodimethylamine*	1.3	10	UR	10	UR	10	UR								
Ethyl Methacrylate		10	UR	10	UR	10	UR								
2-Picoline		10	UR	10	UR	10	UR								
N-Nitrosomethylethylamine		10	UR	10	UR	10	UR								
Methyl methanesulfonate		10	UR	10	UR	10	UR								
N-Nitrosodiethylamine		10	UR	10	UR	10	UR								
Ethyl methanesulfonate*	3.3	10	UR	10	UR	10	UR								
Aniline*	2.7	10	UR	10	UR	10	UR								
Pentachloroethane		10	UR	10	UR	10	UR								
3-Methylphenol		10	UR	10	UR	10	UR								
N-Nitrosopyrrolidine		10	UR	10	UR	10	UR								
Acetophenone*	3.4	10	UR	10	UR	10	UR								
N-Nitrosomorpholine	10	10	UR	10	UR	10	UR								
O-Toluidine		10	UR	10	UR	10	UR								
N-Nitrosopiperidine		52	UR	51	UR	52	UR								
a,a-Dimethlyphenethylamine		10	UR	10	UR	10	UR								
2,6-Dichlorophenol		10	UR	10	UR	10	UR								
Hexachloropropene		10	UR	10	UR	10	UR								
p-Phenylenediamine	100	10	UR	10	UR	10	UR								
N-Nitroso-di-n-butylamine		10	UR	10	UR	10	UR								
Safrole		10	UR	10	UR	10	UR								
1,2,4,5-Tetrachlorobenzene		10	UR	10	UR	10	UR								
Isosafrole		10	UR	10	UR	10	UR								
1,4-Napthaquinone		10	UR	10	UR	10	UR								
1,3-Dinitrobenzene*	3.8	10	UR	10	UR	10	UR								
Pentachlorobenzene		10	UR	10	UR	10	UR								
1-Napthylamine		10	UR	10	UR	10	UR								
2-Napthylamine*	4.4	10	UR	10	UR	10	UR								
2,3,4,6-Tetrachlorophenol		10	UR	10	UR	10	UR								

0090F3

* - The reported detection limit is above the PQL/CRQL

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Project: BECHTEL-HANFORD															
Laboratory: RECRA LabNet															
Case:	SDG: H1173														
Sample Number		B110B2		B110B3		B110B3									
Remarks				Duplicate		Re-analysis									
Sample Date		12/4/00		12/4/00		12/4/00									
Extraction Date		12/8/00		12/8/00		1/3/01									
Analysis Date		12/26/00		12/26/00		1/22/01									
Semivolatile (8270C)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,3,5-Trinitrobenzene		10	UR	10	UR	10	UR								
Diallate		10	UR	10	UR	10	UR								
Phenacetin		10	UR	10	UR	10	UR								
Diphenylamine		10	UR	10	UR	10	UR								
5-Nitro-o-toluidine		10	UR	10	UR	10	UR								
4-Aminobiphenyl		10	UR	10	UR	10	UR								
Pronamide		10	UR	10	UR	10	UR								
2-sec-Butyl-4,6-dinitrophenol		52	UR	51	UR	52	UR								
Pentachloronitrobenzene		52	UR	51	UR	52	UR								
4-Nitroquinoline-1-oxide		21	UR	20	UR	21	UR								
Methapyrilene		10	UR	10	UR	10	UR								
Aramite		21	UR	20	UR	21	UR								
Chlorobenzilate		10	UR	10	UR	10	UR								
p-Dimethylaminoazobenzene		10	UR	10	UR	10	UR								
3,3-Dimethylbenzidine		10	UR	10	UR	10	UR								
2-Acetylaminofluorene		10	UR	10	UR	10	UR								
7,12-Dimethylbenz(a)anthracene*	4.4	10	UR	10	UR	10	UR								
Hexachlorophene*	40	100	UR	100	UR	100	UR								
3-Methylcholanthrene		10	UR	10	UR	10	UR								
1,2-diphenylhydrazine		10	UR	10	UR	10	UR								

* - The reported detection limit is above the PQL/CRQL

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

SEMIVOLATILE/PAH ANALYSIS, WATER MATRIX, (UG/L) Page__5__ of__5__

Project: BECHTEL-HANFORD															
Laboratory: RECRA LabNet															
Case:	SDG: H1173														
Sample Number		B110B2		B110B3											
Remarks				Duplicate											
Sample Date		12/4/00		12/4/00											
Extraction Date		12/8/00		12/8/00											
Analysis Date		12/26/00		12/26/00											
PAH (8310)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Benzo(a)anthracene*	0.1	0.14	UJ	0.13	UJ										
Chrysene*A21	0.1	1.56	UJ	1.53	UJ										
Benzo(k)fluoranthrene*	0.2	0.19	UJ	0.18	UJ										
Benzo(a)pyrene*	0.05	0.18	UJ	0.17	UJ										
Dibenzo(a,h)anthracene*	0.05	0.24	UJ	0.23	UJ										
Benzo(ghi)perylene		0.31	UJ	0.31	UJ										
Indeno(1,2,3-cd)pyrene*	0.1	0.44	UJ	0.44	UJ										

27000

* - The reported detection limit is above the PQL/CRQL

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

5

Recra LabNet - Lionville Laboratory

Semivolatiles by GC/MS, Appendix IX List — Report Date: 01/25/01 09:44

RFW Batch Number: 0012L502 — Client: TNUHANFORD B99-037 H1173 — Work Order: 10985001001 — Page: 1a

	Cust ID:	B110B2	B110B2	B110B2	B110B3	B110B3	B110B3
Sample Information	RFW#:	002	002 MS	002 MSD	003	003	003 MS
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L REPREP	ug/L REPREP
Surrogate Recovery	Nitrobenzene-d5	3 * %	3 * %	18 * %	10 * %	3 * %	1 * %
	2-Fluorobiphenyl	3 * %	4 * %	19 * %	11 * %	6 * %	2 * %
	p-Terphenyl-d14	6 * %	7 * %	33 %	18 * %	11 * %	3 * %
	Phenol-d5	3 * %	4 * %	17 %	10 %	3 * %	19 %
	2-Fluorophenol	3 * %	3 * %	17 * %	10 * %	13 * %	56 %
	2,4,6-Tribromophenol	0 * %	2 * %	13 %	8 * %	40 %	79 %

Compound	B110B2 002	B110B2 002 MS	B110B2 002 MSD	B110B3 003	B110B3 003 REPREP	B110B3 003 MS REPREP
Phenol	10 U R	4 * %	18 %	10 U R	10 U R	15 %
bis(2-Chloroethyl)ether	10 U	20 U	22 U	10 U	10 U	10 U
2-Chlorophenol	10 U	4 * %	18 * %	10 U	10 U	27 %
1,3-Dichlorobenzene	10 U	20 U	22 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	3 * %	16 * %	10 U	10 U	1 * %
Benzyl alcohol	10 U	20 U	22 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	20 U	22 U	10 U	10 U	10 U
2-Methylphenol	10 U	20 U	22 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)ether	10 U	20 U	22 U	10 U	10 U	10 U
4-Methylphenol	10 U	20 U	22 U	10 U	10 U	10 U
N-Nitroso-Di-n-propylamine	10 U	4 * %	18 * %	10 U	10 U	0 * %
Hexachloroethane	10 U	20 U	22 U	10 U	10 U	10 U
Nitrobenzene	10 U	20 U	22 U	10 U	10 U	10 U
Isophorone	10 U	20 U	22 U	10 U	10 U	10 U
2-Nitrophenol	10 U	20 U	22 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	20 U	22 U	10 U	10 U	10 U
Benzoic acid	26 U	50 U	54 U	26 U	26 U	26 U
bis(2-Chloroethoxy)methane	10 U	20 U	22 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	20 U	22 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	3 * %	18 * %	10 U	10 U	1 * %
Naphthalene	10 U	20 U	22 U	10 U	10 U	10 U
4-Chloroaniline	10 U	20 U	22 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	20 U	22 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	3 * %	18 * %	10 U	10 U	0 * %
2-Methylnaphthalene	10 U	20 U	22 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	20 U	22 U	10 U	10 U	10 U

*= Outside of EPA CLP QC limits.

3/13/01

000153

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1b

Cust ID:	B110B2	B110B2	B110B2	B110B3	B110B3	B110B3
RFW#:	002	002 MS	002 MSD	003	003 REPREP	003 MS REPREP
2,4,6-Trichlorophenol	10 U R	20 U	22 U	10 U R	10 U R	10 U
2,4,5-Trichlorophenol	26 U	50 U	54 U	26 U	26 U	26 U
2-Chloronaphthalene	10 U	20 U	22 U	10 U	10 U	10 U
2-Nitroaniline	26 U	50 U	54 U	26 U	26 U	26 U
Dimethylphthalate	10 U	20 U	22 U	10 U	10 U	10 U
Acenaphthylene	10 U	20 U	22 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	20 U	22 U	10 U	10 U	10 U
3-Nitroaniline	26 U	50 U	54 U	26 U	26 U	26 U
Acenaphthene	10 U	4 * %	20 * %	10 U	10 U	2 * %
2,4-Dinitrophenol	26 U	50 U	54 U	26 U	26 U	26 U
4-Nitrophenol	26 U	0 * %	10 %	26 U	26 U	45 %
Dibenzofuran	10 U	20 U	22 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	2 * %	16 * %	10 U	10 U	0 * %
Diethylphthalate	10 U	20 U	22 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	20 U	22 U	10 U	10 U	10 U
Fluorene	10 U	20 U	22 U	10 U	10 U	10 U
4-Nitroaniline	26 U	50 U	54 U	26 U	26 U	26 U
4,6-Dinitro-2-methylphenol	26 U	50 U	54 U	26 U	26 U	26 U
N-Nitrosodiphenylamine (1)	10 U	20 U	22 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	20 U	22 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	20 U	22 U	10 U	10 U	10 U
Pentachlorophenol	26 U	0 * %	4 * %	26 U	26 U	44 %
Phenanthrene	10 U	20 U	22 U	10 U	10 U	10 U
Anthracene	10 U	20 U	22 U	10 U	10 U	10 U
Di-n-Butylphthalate	10 U	20 U	22 U	10 U	10 U	10 U
Fluoranthene	10 U	20 U	22 U	10 U	10 U	10 U
Pyrene	10 U	5 * %	28 %	10 U	10 U	2 * %
Butylbenzylphthalate	10 U	20 U	22 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	20 U	22 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	20 U	22 U	10 U	10 U	10 U
Chrysene	10 U	20 U	22 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	20 U	22 U	10 U	5 JB	3 JB
Di-n-Octyl phthalate	10 U	20 U	22 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	20 U	22 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	20 U	22 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	20 U	22 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	20 U	22 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	20 U	22 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	20 U	22 U	10 U	10 U	10 U
1,4-Dioxane	10 U	20 U	22 U	10 U	10 U	10 U

*= Outside of EPA CLP QC limits.

3/13/01

10

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1c

	B110B2	B110B2	B110B2	B110B3	B110B3	B110B3
RFW#:	002	002 MS	002 MSD	003	003 REPREP	003 MS REPREP
Methyl methacrylate	10 U R	20 U	22 U	10 U R	10 U R	10 U
Pyridine	10 U	20 U	22 U	10 U	10 U	10 U
N-Nitrosodimethylamine	10 U	20 U	22 U	10 U	10 U	10 U
Ethyl methacrylate	10 U	20 U	22 U	10 U	10 U	10 U
2-Picoline	10 U	20 U	22 U	10 U	10 U	10 U
N-Nitrosomethylethylamine	10 U	20 U	22 U	10 U	10 U	10 U
Methyl methanesulfonate	10 U	20 U	22 U	10 U	10 U	10 U
N-Nitrosodiethylamine	10 U	20 U	22 U	10 U	10 U	10 U
Ethyl methanesulfonate	10 U	20 U	22 U	10 U	10 U	10 U
Aniline	10 U	20 U	22 U	10 U	10 U	10 U
Pentachloroethane	10 U	20 U	22 U	10 U	10 U	10 U
3-Methylphenol	10 U	20 U	22 U	10 U	10 U	10 U
N-Nitrosopyrrolidine	10 U	20 U	22 U	10 U	10 U	10 U
Acetophenone	10 U	20 U	22 U	10 U	10 U	10 U
N-Nitrosomorpholine	10 U	20 U	22 U	10 U	10 U	10 U
o-Toluidine	10 U	20 U	22 U	10 U	10 U	10 U
N-Nitrosopiperidine	52 U	100 U	110 U	51 U	52 U	52 U
a,a-Dimethylphenethylamine	10 U	20 U	22 U	10 U	10 U	10 U
2,6-Dichlorophenol	10 U	20 U	22 U	10 U	10 U	10 U
Hexachloropropene	10 U	20 U	22 U	10 U	10 U	10 U
p-Phenylenediamine	10 U	20 U	22 U	10 U	10 U	10 U
N-Nitroso-di-n-butylamine	10 U	20 U	22 U	10 U	10 U	10 U
Safrole	10 U	20 U	22 U	10 U	10 U	10 U
1,2,4,5-Tetrachlorobenzene	10 U	20 U	22 U	10 U	10 U	10 U
Isosafrole	10 U	20 U	22 U	10 U	10 U	10 U
1,4-Naphthoquinone	10 U	20 U	22 U	10 U	10 U	10 U
1,3-Dinitrobenzene	10 U	20 U	22 U	10 U	10 U	10 U
Pentachlorobenzene	10 U	20 U	22 U	10 U	10 U	10 U
1-Naphthylamine	10 U	20 U	22 U	10 U	10 U	10 U
2-Naphthylamine	10 U	20 U	22 U	10 U	10 U	10 U
2,3,4,6-Tetrachlorophenol	10 U	20 U	22 U	10 U	10 U	10 U
1,3,5-Trinitrobenzene	10 U	20 U	22 U	10 U	10 U	10 U
Diallate	10 U	20 U	22 U	10 U	10 U	10 U
Phenacetin	10 U	20 U	22 U	10 U	10 U	10 U
Diphenylamine	10 U	20 U	22 U	10 U	10 U	10 U
5-Nitro-o-toluidine	10 U	20 U	22 U	10 U	10 U	10 U
4-Aminobiphenyl	10 U	20 U	22 U	10 U	10 U	10 U
Pronamide	10 U	20 U	22 U	10 U	10 U	10 U
2-sec-Butyl-4,6-dinitrophenol	52 U	100 U	110 U	51 U	52 U	52 U
Pentachloronitrobenzene	52 U	100 U	110 U	51 U	52 U	52 U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1d

Cust ID:	B110B2		B110B2		B110B2		B110B3		B110B3		B110B3	
RFW#:	002		002 MS		002 MSD		003		003 REPREP		003 MS REPREP	
4-Nitroquinoline-1-oxide	21	U R	40	U	44	U	20	U R	21	U R	21	U
Methapyrilene	10	U	20	U	22	U	10	U	10	U	10	U
Aramite	21	U	40	U	44	U	20	U	21	U	21	U
Chlorobenzilate	10	U	20	U	22	U	10	U	10	U	10	U
p-Dimethylaminoazobenzene	10	U	20	U	22	U	10	U	10	U	10	U
3,3'-Dimethylbenzidine	10	U	20	U	22	U	10	U	10	U	10	U
2-Acetylaminofluorene	10	U	20	U	22	U	10	U	10	U	10	U
7,12-Dimethylbenz(a)anthracene	10	U	20	U	22	U	10	U	10	U	10	U
Hexachlorophene	100	U	200	U	220	U	100	U	100	U	100	U
3-Methylcholanthrene	10	U	20	U	22	U	10	U	10	U	10	U
1,2-Diphenylhydrazine	10	U	20	U	22	U	10	U	10	U	10	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

3/13/01

000025

	Cust ID:	B110B3	SBLKJW	SBLKJW BS	SBLKLV	SBLKLV BS
Sample Information	RFW#:	003 MSD	00LE1613-MB1	00LE1613-MB1	01LE0005-MB1	01LE0005-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L
		REPREP				
Surrogate Recovery	Nitrobenzene-d5	11 * %	1 * %	4 * %	8 * %	0 * %
	2-Fluorobiphenyl	13 * %	1 * %	4 * %	11 * %	5 * %
	p-Terphenyl-d14	43 %	2 * %	7 * %	7 * %	12 * %
	Phenol-d5	61 %	0 * %	4 * %	6 * %	9 * %
	2-Fluorophenol	74 %	0 * %	4 * %	8 * %	2 * %
	2,4,6-Tribromophenol	98 %	0 * %	0 * %	17 %	71 %
		fl	fl	fl	fl	fl
Phenol		52 %	10 U	4 * %	10 U	10 * %
bis(2-Chloroethyl)ether		10 U	10 U	10 U	10 U	10 U
2-Chlorophenol		56 %	10 U	4 * %	10 U	3 * %
1,3-Dichlorobenzene		10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene		8 * %	10 U	4 * %	10 U	0 * %
Benzyl alcohol		10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene		10 U	10 U	10 U	10 U	10 U
2-Methylphenol		10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)ether		10 U	10 U	10 U	10 U	10 U
4-Methylphenol		10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-propylamine		10 * %	10 U	3 * %	10 U	2 * %
Hexachloroethane		10 U	10 U	10 U	10 U	10 U
Nitrobenzene		10 U	10 U	10 U	10 U	10 U
Isophorone		10 U	10 U	10 U	10 U	10 U
2-Nitrophenol		10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol		10 U	10 U	10 U	10 U	10 U
Benzoic acid		26 U	25 U	25 U	25 U	25 U
bis(2-Chloroethoxy)methane		10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol		10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene		9 * %	10 U	4 * %	10 U	0 * %
Naphthalene		10 U	10 U	10 U	10 U	10 U
4-Chloroaniline		10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene		10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol		9 * %	10 U	3 * %	10 U	0 * %
2-Methylnaphthalene		10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene		10 U	10 U	10 U	10 U	10 U

*= Outside of EPA CLP QC limits.

3/2/01

000039

Cust ID:	B110B3	SBLKJW	SBLKJW BS	SBLKLV	SBLKLV BS
RFW#:	003 MSD REPREP	00LE1613-MB1	00LE1613-MB1	01LE0005-MB1	01LE0005-MB1
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	26 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	26 U	25 U	25 U	25 U	25 U
Dimethylphthalate	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	26 U	25 U	25 U	25 U	25 U
Acenaphthene	10 * %	10 U	4 * %	10 U	6 * %
2,4-Dinitrophenol	26 U	25 U	25 U	25 U	25 U
4-Nitrophenol	21 %	25 U	0 * %	25 U	23 %
Dibenzofuran	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	0 * %	10 U	2 * %	10 U	2 * %
Diethylphthalate	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	26 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	26 U	25 U	25 U	25 U	25 U
N-Nitrosodiphenylamine (1)	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	36 %	25 U	0 * %	25 U	11 %
Phenanthrene	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U
Pyrene	14 * %	10 U	5 * %	10 U	11 * %
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	4 JB	1 J	10 U	3 J	3 JB
Di-n-Octyl phthalate	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U
1,4-Dioxane	10 U	10 U	10 U	10 U	10 U

*= Outside of EPA CLP QC limits.

3/15/01

C00024

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 2c

Cust ID:	B110B3		SBLKJW		SBLKJW BS		SBLKLV		SBLKLV BS	
RFW#:	003 MSD REPREP		00LE1613-MB1		00LE1613-MB1		01LE0005-MB1		01LE0005-MB1	
Methyl methacrylate	10	U	10	U	10	U	10	U	10	U
Pyridine	10	U	10	U	10	U	10	U	10	U
N-Nitrosodimethylamine	10	U	10	U	10	U	10	U	10	U
Ethyl methacrylate	10	U	10	U	10	U	10	U	10	U
2-Picoline	10	U	10	U	10	U	10	U	10	U
N-Nitrosomethylethylamine	10	U	10	U	10	U	10	U	10	U
Methyl methanesulfonate	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiethylamine	10	U	10	U	10	U	10	U	10	U
Ethyl methanesulfonate	10	U	10	U	10	U	10	U	10	U
Aniline	10	U	10	U	10	U	10	U	10	U
Pentachloroethane	10	U	10	U	10	U	10	U	10	U
3-Methylphenol	10	U	10	U	10	U	10	U	10	U
N-Nitrosopyrrolidine	10	U	10	U	10	U	10	U	10	U
Acetophenone	10	U	10	U	10	U	10	U	10	U
N-Nitrosomorpholine	10	U	10	U	10	U	10	U	10	U
o-Toluidine	10	U	10	U	10	U	10	U	10	U
N-Nitrosopiperidine	52	U	50	U	50	U	50	U	50	U
a,a-Dimethylphenethylamine	10	U	10	U	10	U	10	U	10	U
2,6-Dichlorophenol	10	U	10	U	10	U	10	U	10	U
Hexachloropropene	10	U	10	U	10	U	10	U	10	U
p-Phenylenediamine	10	U	10	U	10	U	10	U	10	U
N-Nitroso-di-n-butylamine	10	U	10	U	10	U	10	U	10	U
Safrole	10	U	10	U	10	U	10	U	10	U
1,2,4,5-Tetrachlorobenzene	10	U	10	U	10	U	10	U	10	U
Isosafrole	10	U	10	U	10	U	10	U	10	U
1,4-Naphthoquinone	10	U	10	U	10	U	10	U	10	U
1,3-Dinitrobenzene	10	U	10	U	10	U	10	U	10	U
Pentachlorobenzene	10	U	10	U	10	U	10	U	10	U
1-Naphthylamine	10	U	10	U	10	U	10	U	10	U
2-Naphthylamine	10	U	10	U	10	U	10	U	10	U
2,3,4,6-Tetrachlorophenol	10	U	10	U	10	U	10	U	10	U
1,3,5-Trinitrobenzene	10	U	10	U	10	U	10	U	10	U
Diallate	10	U	10	U	10	U	10	U	10	U
Phenacetin	10	U	10	U	10	U	10	U	10	U
Diphenylamine	10	U	10	U	10	U	10	U	10	U
5-Nitro-o-toluidine	10	U	10	U	10	U	10	U	10	U
4-Aminobiphenyl	10	U	10	U	10	U	10	U	10	U
Pronamide	10	U	10	U	10	U	10	U	10	U
2-sec-Butyl-4,6-dinitrophenol	52	U	50	U	50	U	50	U	50	U
Pentachloronitrobenzene	52	U	50	U	50	U	50	U	50	U

*= Outside of EPA CLP QC limits.

3/15/01

000022

Cust ID:	B110B3	SBLKJW	SBLKJW BS	SBLKLV	SBLKLV BS
RFW#:	003 MSD REPREP	00LE1613-MB1	00LE1613-MB1	01LE0005-MB1	01LE0005-MB1
4-Nitroquinoline-1-oxide	21 U	20 U	20 U	20 U	20 U
Methapyrilene	10 U	10 U	10 U	10 U	10 U
Aramite	21 U	20 U	20 U	20 U	20 U
Chlorobenzilate	10 U	10 U	10 U	10 U	10 U
p-Dimethylaminoazobenzene	10 U	10 U	10 U	10 U	10 U
3,3'-Dimethylbenzidine	10 U	10 U	10 U	10 U	10 U
2-Acetylaminofluorene	10 U	10 U	10 U	10 U	10 U
7,12-Dimethylbenz(a)anthracene	10 U	10 U	10 U	10 U	10 U
Hexachlorophene	100 U	100 U	100 U	100 U	100 U
3-Methylcholanthrene	10 U	10 U	10 U	10 U	10 U
1,2-Diphenylhydrazine	10 U	10 U	10 U	10 U	10 U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

3/13/01

Lionville Laboratory, Inc.

PAH'S by HPLC / Method 8310 Report Date: 02/08/01 16:44

RFW Batch Number: **0012L502** Client: **TNUHANFORD B99-037 H1173** Work Order: 10985001001 Page: 1

	Cust ID:	B110B2	B110B3	BLK	BLK BS	BLK BSD
Sample Information	RFW#:	002	003	00LE1611-MB1	00LE1611-MB1	00LE1611-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Triphenylene		50 * %	48 * %	62 * %	64 * %	58 * %
Benzo(a)anthracene		0.14 U J	0.13 U J	0.13 U	68 * %	57 * %
Chrysene		1.56 U	1.53 U	1.50 U	64 * %	58 * %
Benzo(b)fluoranthrene		0.19 U	0.18 U	0.18 U	67 * %	59 * %
Benzo(k)fluoranthrene		0.18 U	0.17 U	0.17 U	67 * %	59 * %
Benzo(a)pyrene		0.24 U	0.23 U	0.23 U	63 * %	54 * %
Dibenzo(a,h)anthracene		0.31 U	0.31 U	0.30 U	66 %	59 * %
Indeno(1,2,3-cd)pyrene		0.45 U	0.44 U	0.43 U	68 %	58 * %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Client: TNU-HANFORD B99-037
RFW #: 0012L502
SDG/SAF #: H1173/B99-037

W.O. #: 10985-001-001-9999-00
Date Received: 12-07-2000

SEMIVOLATILE

Two (2) water samples were collected on 12-04-2000.

The samples and their associated QC samples were extracted on 12-08-2000, re-extracted on 01-03-2001 and analyzed according to criteria set forth in Lionville laboratory OPs based on SW 846 Method 8270C for client specified Semivolatile target compounds on 12-26-2000 and 01-09,22-2001.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The samples were initially extracted and analyzed within required holding times; however, sample B110B3 was re-extracted outside of holding time. See item 4.

3. Non-target compounds were not detected in the samples.

4. Samples in extraction batch 00LE1613-MB1 were spiked with 75ug of base-neutral surrogates and 50ug of acid surrogates. The percent (%) recoveries were adjusted accordingly. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

5. Fifty-two (52) of sixty-six (66) surrogate recoveries were outside acceptance criteria. Sample B110B3 was re-extracted on 01-03-2001, analyzed on 01-22-2001 and reported. The re-extract analyses did not meet criteria; however, no sample volume remained for further analyses. A copy of the Sample Discrepancy Reports (SDR) has been enclosed.

6. Thirty-three (33) of forty-four (44) matrix spike recoveries were outside EPA QC limits. The matrix spike analyses associated with sample B110B3 went to dryness during the extraction process. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

7. Twenty (20) of twenty-two (22) blank spike recoveries were outside EPA QC limits. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

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8. The method blanks contained the common laboratory contaminant Bis(2-Ethylhexyl)phthalate at levels less than the CRQL.

9. Internal standard area criteria were not met for the method blank 01LE0005-MB1. The GC/MS instrument was inspected for possible malfunction and was judged to be functioning properly.

10. A spectral search was performed for 1-Acetyl-2-thiourea, 2,5-Diaminotoluene, 1,4-Dinitrobenzene, O, O, O-Triethylphosphorothioate and 2-Cyclohexyl-4,6-Dinitrophenol. However, these compounds were not identified in any samples.

11. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

12. As of January 27, 2001, Recra LabNet Philadelphia became Lionville Laboratory Incorporated. Some Forms may still reference Recra LabNet Philadelphia.

By _____

J. Michael Taylor
President
Lionville Laboratory Incorporated

02/14/01
Date

som\group\data\bna\tnu-hanford-12-502.doc

LVLI LIONVILLE LABORATORY INC.

2A

RECRA **Sample Discrepancy Report (SDR)** SDR #: 00EX194

Initiator: Bernard Foley Batch: 00122502 Parameter: OL25
Date: 12/8/00 Samples: 23 Matrix: W
Client: TNU Method: SW846/MCAWW/CLP/ Prep Batch: 00LE1613

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C
__ Transcription Error __ Wrong Test Code __ Other ______

b. General Discrepancy

__ Missing Sample/Extract* __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note*: Verified by [Log-in] or [Prep Group] (circle)...signature/date: ______

c. QC Problem (Include all relevant specific results; attach data if necessary)

Surrogate Concentrations

2. Known or Probable Causes(s) (To be used for trend analysis)

__ Lack of Organization
__ Lack of Training
__ Lack of Discipline
__ Lack of Resources
__ Lack of Time
__ Lack of Management Support

__ Other (Please explain):

3. Discussion and Proposed Action

__ Re-log
__ Entire Batch
__ Following Samples: ______
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to ______
__ Place On/Take Off Hold (circle)

Other Description: Pending receipt of back ordered standards use ESI as surrogate w/ a second analyte list. [initials] 12/13/00

4. Project Manager Instructions...signature/date: ______

__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person ______
__ Add
__ Cancel

5. Final Action...signature/date: DAC 1/25/01

Other Explanation:

__ Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA for distribution and filing.

Route/Distribution of SDR

__ Initiator
__ Lab Manager: M. Taylor
__ Project Mgr: Stone/Carey/Johnson
__ Section Mgr: Wesson/Daniels
X QA (file): Schrenkel
__ Data Management: Feldman
__ Sample Prep: Bickel/Kauffman

Route Distribution of Completed SDR

__ Metals: Doughty
__ Inorganic: Perrone
__ GC/LC: Pastor
__ MS: Layman/Rycklak
__ Log-in: Keppel
__ Admin: Soos
__ Other: ______

RECRA Sample Discrepancy Report (SDR) SDR #: 00MS418

Initiator: JLayman Batch: 0012L502 Parameter: BNA
Date: 12-28-00 Samples: all Matrix: Water
Client: TNU Hunter Method: SW846/MCAWW/CLP/ Prep Batch: 00E1113

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C
__ Transcription Error __ Wrong Test Code __ Other ____

b. General Discrepancy

__ Missing Sample/Extract __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: ____

c. QC Problem (Include all relevant specific results; attach data if necessary)

all spikes & surrogates very low

2. Known or Probable Causes(s) (To be used for trend analysis)

__ Lack of Organization
__ Lack of Training
__ Lack of Discipline
__ Lack of Resources
__ Lack of Time
__ Lack of Management Support
__ Other (Please explain):

3. Discussion and Proposed Action Other Description:

__ Re-log
__ Entire Batch
__ Following Samples: ____
__ Re-leach
✓ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to ____
__ Place On/Take Off Hold (circle)

Reextract

4. Project Manager Instructions...signature/date: [signature] 12/28/00

✓ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person ____
__ Add
__ Cancel

5. Final Action...signature/date: [signature] 1/3/01 [initials] 1/3/01 Other Explanation: Sample #003 only Batch 01E0005

X Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative D AK 1/26/01
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA for distribution and filing.

Route/Distribution of SDR		Route	Distribution of Completed SDR
__	Initiator		
__	Lab Manager: M. Taylor	__	Metals: Doughty
1	Project Mgr: Stone/Carey/Johnson	__	Inorganic: Perrone
__	Section Mgr: Wesson/Daniels	__	GC/LC: Pastor
X	QA (file): Schrenkel	2	MS: Layman/Rycklak
__	Data Management: Feldman	__	Log-in: Keppel
__	Sample Prep: Bickel/Kauffman	__	Admin: Soos
		__	Other: ____

R1 Login BK 1/3/01

000029

L-WI-006/E-08/00

RECRA Sample Discrepancy Report (SDR) SDR #: 00B4003

Initiator: Bernard Edey Batch: 00121502 Parameter: OLCS
Date: 1/8/01 Samples: 3,3msd Matrix: W
Client: TNN Method: SW846/MCAWW/CLP/ Prep Batch: 011E0005

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C
__ Transcription Error __ Wrong Test Code __ Other ____________

b. General Discrepancy

__ Missing Sample/Extract __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: ____________

c. QC Problem (Include all relevant specific results; attach data if necessary)

Base fraction 003msd lost during filtration 003 blown down to Dryness on N-EVAP

2. Known or Probable Causes(s) (To be used for trend analysis)

__ Lack of Organization
__ Lack of Training
__ Lack of Discipline
__ Lack of Resources
__ Lack of Time
__ Lack of Management Support

X Other (Please explain):

glassware ~~tot~~ breakage (msd)

3. Discussion and Proposed Action

__ Re-log
__ Entire Batch
__ Following Samples: ____________
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to ____________
__ Place On/Take Off Hold (circle)

Other Description:

4. Project Manager Instructions... signature/date: ____________

__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person ____________
__ Add
__ Cancel

5. Final Action... signature/date: DAL 1/12/01

__ Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

Other Explanation:

When Final Action has been recorded, forward original to QA for distribution and filing.

Route/Distribution of SDR

__ Initiator
__ Lab Manager: M. Taylor
1 Project Mgr: Stone/Carey/Johnson
__ Section Mgr: Wesson/Daniels
X QA (file): Schrenkel
__ Data Management: Feldman
__ Sample Prep: Bickel/Kauffman

Route / Distribution of Completed SDR

__ Metals: Doughty
__ Inorganic: Perrone
__ GC/LC: Pastor
2 MS: Layman/Rycklak
__ Log-in: Keppel
__ Admin: Soos
__ Other: ____________

RECRA Sample Discrepancy Report (SDR) SDR #: 01M5051

Initiator: Robert Carder Batch: 0012502 Parameter: 0625H
Date: 1/24/01 Samples: 3,35,37 BLK,BS Matrix: W
Client: TW Hanford Method: SW846/MCAWW/CLP reanalysis Prep Batch: 011E0005

1. Reason for SDR

a. COC Discrepancy
__ Tech Profile Error __ Client Request __ Sampler Error on C-O-C
__ Transcription Error __ Wrong Test Code __ Other _____

b. General Discrepancy
__ Missing Sample/Extract __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. QC Problem (Include all relevant specific results; attach data if necessary)

Multiple surrogates and spikes fail in all samples

2. Known or Probable Causes(s) (To be used for trend analysis)

___ Lack of Organization
___ Lack of Training
___ Lack of Discipline
___ Lack of Resources
___ Lack of Time
___ Lack of Management Support
___ Other (Please explain):

3. Discussion and Proposed Action

__ Re-log
__ Entire Batch
__ Following Samples: _____
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to _____
__ Place On/Take Off Hold (circle)

Other Description:
Volume depleted
report narrate

[signature] 1/24/01

4. Project Manager Instructions...signature/date: [signature] 1/24/01

✓ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

5. Final Action...signature/date: DAC 1/26/01

Other Explanation:
__ Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative DAC on the Log
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA for distribution and filing.

Route	Route/Distribution of SDR	Route	Distribution of Completed SDR
__	Initiator	__	Metals: Doughty
__	Lab Manager: M. Taylor	__	Inorganic: Perrone
i	Project Mgr: Stone/Carey/Johnson	__	GC/LC: Pastor
__	Section Mgr: Wesson/Daniels	Z	MS: Layman/Rycklak
X	QA (file): Schrenkel	__	Log-In: Keppel
__	Data Management: Feldman	__	Admin: Soos
__	Sample Prep: Bickel/Kauffman	__	Other: _____

000021

LIONVILLE LABORATORY INC.

Analytical Report

Client : TNU-HANFORD B99-037
RFW# : 0012L502
SDG/SAF# : H1173/B99-037

W.O #: 10985-001-001-9999-00
Date Received: 12-07-00

POLYNUCLEAR AROMATIC HYDROCARBONS BY HPLC

The set of samples consisted of two (2) water samples collected on 12-04-00.

The samples and their associated QC samples were extracted on 12-08-00 and analyzed utilizing Lionville Laboratory OP's based on SW-846 Method 8310 for a list of client specified Polynuclear Aromatic Hydrocarbon target compounds on 02-06-01.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All cooler temperatures have been recorded on the chain-of-custodies.

2. The analytical hold time for these samples was exceeded as the required lamp for the fluorescence detector maintenance was back ordered from the manufacturer. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

3. All initial calibrations associated with this data set were within acceptance criteria.

4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.

5. All surrogate recoveries exceeded acceptance criteria. A copy of the SDR has been enclosed.

6. Twelve (12) of fourteen (14) blank spike recoveries were outside the laboratory control limits. A copy of the SDR has been enclosed.

7. No matrix spike recoveries were reported with this data package. A copy of the SDR has been enclosed.

8. As of January 27, 2001, Recra Labnet Philadelphia became Lionville Laboratory Incorporated. Some forms may still reference Recra Labnet Philadelphia.

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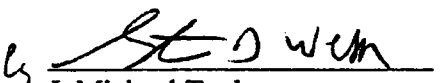
9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.



J. Michael Taylor
President
Lionville Laboratory Incorporated

02-12-01
Date

r:\group\hplc\nam\8310\2001\12-502mu.doc

Lionville Laboratory Sample Discrepancy Report (SDR) SDR #: 01LC020

Initiator: L. Kauffman Batch: 0012L502 Parameter: 08310
Date: 2/8/01 Samples: 002, 003 Matrix: Water
Client: TVA Method: SW846/MCAWW/CLP/ Prep Batch: 00LE1611

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C
__ Transcription Error __ Wrong Test Code __ Other ____

b. General Discrepancy
__ Missing Sample/Extract* __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample* __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: ____

c. Problem (Include all relevant specific results; attach data if necessary) All surrogate recoveries out of range. No spike added to MS/MSD. 12 targets out of 14 in MB1-S & MB1-T out of range.

2. Known or Probable Causes(s)

Interference coelutes w/ triphenylene on fluorescence side. [initials] 2/8/01

3. Discussion and Proposed Action Other Description: Report UV data for surrogate recoveries.
__ Re-log
__ Entire Batch
__ Following Samples: ____
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to ____
__ Place On/Take Off Hold (circle)

4. Project Manager Instructions...signature/date: Jennifer Johnson 2/8/01
__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
✓ Include in Case Narrative
__ Client Contacted:
Date/Person ____
__ Add
__ Cancel

5. Final Action...signature/date: [signature] 2/8/01 Other Explanation: Package corrected to reflect UV surrogate data. Cancelled 003 MS and MSD and reported BSD results.
__ Verified re-[log][leach][extract][digest][analysis] (circle)
__ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
__	X Initiator	__	__ Metals: Doughty
__	X Lab General Manager: M. Taylor	__	__ Inorganic: Perrone
__	X Project Mgr: Stone/Johnson	__	__ GC/LC: Pastor
__	X Technical Mgr: Wesson/Daniels	__	__ MS: Rycklak/Layman
__	X QA (file): Alberts LK 2/8/01	__	__ Log-in: Keppel
__	__ Data Management: Feldman	__	__ Admin: Soos
__	__ Sample Prep: Doughty/Kiger	__	__ Other: ____

RECRA — **Sample Discrepancy Report (SDR)** — SDR #: 0160013

Initiator: F. Kiser Batch: 00121502 Parameter: 08310
Date: 1/16/01 Samples: 2,3 Matrix: Water
Client: Thee Hanford Method: SW846/MCAWW/CLP/ Prep Batch: 00LE1611

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C
__ Transcription Error __ Wrong Test Code __ Other ______

b. General Discrepancy
__ Missing Sample/Extract __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: ______

c. QC Problem (Include all relevant specific results; attach data if necessary)

Samples not run yet - Fluorescence Lamp on back order for at least 2 weeks. Probably can't run within analytical hold.

HT up 1/17/01

2. Known or Probable Causes(s) (To be used for trend analysis)
__ Lack of Organization
__ Lack of Training
__ Lack of Discipline
__ Lack of Resources
__ Lack of Time
__ Lack of Management Support
__ Other (Please explain):

3. Discussion and Proposed Action Other Description:
__ Re-log
__ Entire Batch
__ Following Samples: ______
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to ______
__ Place On/Take Off Hold (circle)

4. Project Manager Instructions...signature/date: [signature] 1/22/01
__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
✓ Include in Case Narrative
__ Client Contacted:
Date/Person ______
__ Add
__ Cancel

5. Final Action...signature/date: [signature] 2/12/01 Other Explanation: Hold time exceeded.
__ Verified re-[log][leach][extract][digest][analysis] (circle)
✓ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA for distribution and filing.

Route/Distribution of SDR		Route	Distribution of Completed SDR
__	Initiator	__	Metals: Doughty
__	Lab Manager: M. Taylor	__	Inorganic: Perrone
__	Project Mgr: Stone/Carey/Johnson	__	GC/LC: Pastor
__	Section Mgr: Wesson/Daniels	__	MS: Layman/Rycklak
X	QA (file): Schrenkel	__	Log-in: Keppel
__	Data Management: Feldman	__	Admin: Soos
__	Sample Prep: Bickel/Kauffman	__	Other: ______

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-037-11

Page 3 of 6 (1 of 3, 2 of 3, 3 of 3)

Collector: Fahlberg/Johansen	Company Contact: F Roeck	Telephone No.: 372-9086	Project Coordinator: WEISS, RL
Project Designation: ERDF Leachate Delisting Analysis	Sampling Location: ERDF		SAF No.: B99-037
Ice Chest No.: ERC 96-034, 039, 042 (1 of 3, 2 of 3, 3 of 3)	Field Logbook No.: EL 1517-1	COA: RERDF22560	Method of Shipment: Fed EX
Shipped To: TMA/RECRA R 12-4-00	Offsite Property No.: A0100034		Bill of Lading/Air Bill No.: 4235 7455- 0967, 0978, 0989

Price Code: 7N — Air Quality — Data Turnaround: 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Preservation	HNO3 to pH <2	ZnAc+NaOH to pH >9 Cool	HCl to pH <2	HNO3 to pH <2	NaOH to pH >= 12 Cool 4C	None	Cool 4C EF	Cool 4C IJ	Cool 4C GH	Cool 4C
Type of Container	P	P	P	P	P	P	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	2	2	2	2
Volume	500mL Delete RT	500mL	1000mL Delete RT 12400	1000mL Delete RT 12400	1000mL	1000mL Delete RT 12400	1000mL	1000mL	1000mL	1000mL
SAMPLE ANALYSIS	Total Uranium 12400	Sulfides - 9030	Technetium-99 RT 12400	See item (1) in Special Instructions	Total Cyanide - 9010	Cyanide-14 12400	See item (2) in Special Instructions	Chloro-Herbicides - EPA8151	Pest/PCBs - 8081	See item (3) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time									
~~B110B1~~	WATER	12-4-00	0900 RT 12400									
B110B2	WATER	12-4-00	0945		X			X		X	X	X
B110B3	WATER	12-4-00	1015		X			X		X	X	X
~~B11266~~	WATER	12-4-00	0945									
~~B11266~~	WATER	12-4-00	1015 RT 12400									

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg R Fahlberg	12-4-00 1130	R Thoren	12-4-00 1130
R Thoren	12.4.00 1300	STORED IN RLF 2B 3728	12.4.00 1300
REMOVED FROM RLF 2B 3728	12-6-00 0900	R. Thoren	12-5-00 0900
R Thoren	12-5-00 0900	FEDEX	
FedEx	12-6-00 0915		12-6-00 0915
FedEx	12-7-00 0945		12-7-00 0945

SPECIAL INSTRUCTIONS

~~(1) Gamma Spectroscopy (Water) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~ RT 12400

(2) 8310_SVOA_HPLC {Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenz[a,h]anthracene}

(3) Semi-VOA - 8270A (App IX): Semi-VOA -- 8270A (App IX Add-On) {1,2-Diphenylhydrazine, 1,4-Dinotrobenzene, 1-Acetyl-2-thiourea, 2,5-Diaminotoluene, 2-Cyclohexyl-4,6-dinitrophenol}

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12400

Matrix *

S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

HI-EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: ERDF			DATA PACKAGE: H1173		
VALIDATOR:		LAB: LVI		DATE: 3/5/01	
CASE:			SDG: H1173		

ANALYSES PERFORMED

☐ CLP Volatiles	☐ SW-846 8240 (cap column)	☐ SW-846 8260 (packed column)	☐ CLP Semivolatiles	☒ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☐	☐	☐	☒ 8310	☐

SAMPLES/MATRIX	B110B2 B110B3 \PAH
	B110B3R - reanalyses

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . Yes No (N/A)

Is a case narrative present? . . . . (Yes) No N/A

Comments: ______

2. HOLDING TIMES

Are sample holding times acceptable? . . . . Yes (No) N/A

Comments: SU B110B3R — R all UJ — 2X hold time
PAH ≤ <2X on analysis J all

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A
Are continuing calibrations acceptable? . . . . . Yes No N/A
Comments:

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A
Are laboratory blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A
Comments: NO FB

See surrogate ~~Accuracy~~ accuracy

PAH ok

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed? . . . . . Yes No N/A
Are surrogate/System Monitoring Compound recoveries acceptable? Yes No N/A
Were MS/MSD samples analyzed? . . . . . Yes No N/A
Are MS/MSD results acceptable? . . . . . Yes No N/A
Comments: R all SV
J all PAH NO MS/MSD

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . Yes No (N/A)
Are field duplicate RPD values acceptable? . . . . . Yes No (N/A)
Are field split RPD values acceptable? . . . . . Yes No (N/A)
Comments: PAH Field dup ok

7. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No (N/A)
Are internal standard areas acceptable? . . . . . Yes No (N/A)
Are internal standard retention times acceptable? . . . . . Yes No (N/A)
Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No (N/A)
Is compound quantitation acceptable? . . . . . Yes No (N/A)
Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . (Yes) No N/A
Are all results supported in the raw data? . . . . . Yes No (N/A)
Do results meet the CRQLs? . . . . . Yes (No) N/A
Has the laboratory properly identified and coded all TIC? . . . Yes No (N/A)
Comments: See narrative

Date: 15 March 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF Leachate Delisting Analysis
Subject: Inorganics - Data Package No. H1173-RLN (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1173-RLN prepared by Recra Environmental Incorporated (RLN). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/4/00	Water	C	See note 1
B110B3	12/400	Water	C	See note 1

1- ICP metals by 6010B; mercury by 7470A.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times for mercury and ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be analyzed within six (6) months for ICP metals and 28 days for mercury.

  All holding times were acceptable.

- **Blanks**

Preparation (Method) Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations (in ug/L) less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Contract Required Detection Limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of less than 25% and a sample result below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 66.8%, all sodium results were qualified as estimates and flagged "J".

All other matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 20% for water samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the CRDL or plus or minus the CRDL for positive sample results less than five times the CRDL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPDs for chromium (47%) and iron (96%) were outside QC limits. Under the BHI statement of work, no qualification is required. All other duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. The reported detection limits for thallium, mercury and antimony were above the PQL in both samples. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package No. H1173-RLN (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 66.8%, all sodium results were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The reported detection limits for thallium, mercury and antimony were above the PQL in both samples. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE *Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary*, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Sodium	J	All	MS recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																	
Laboratory: Recra LabNet																	
Case	SDG: H1173																
Sample Number		B110B2		B110B3													
Remarks				Duplicate													
Sample Date		12/04/00		12/04/00													
Inorganics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	6	1.1	U	1.1	U												
Aluminum	31	22.7	U	26.0													
Arsenic	82	11.3		11.0													
Barium	0.4	97.7		99.4													
Beryllium	0.4	0.10	U	0.10	U												
Calcium	16	194000		197000													
Cadmium	3.3	0.30	U	0.30	U												
Cobalt	4.3	0.90	U	0.90	U												
Chromium	2.7	40.9		25.2													
Copper	4.1	9.0		9.5													
Iron	100	128		44.9													
Mercury	0.03	0.10	U	0.10	U												
Potassium	2200	23400		23500													
Magnesium	5000	57700		58800													
Manganese	1	0.73		0.20	U												
Sodium	34	264000		253000													
Nickel	15	13.6		12.1													
Lead	30	2.1	U	2.1	U												
Antimony	2	2.3	U	2.3	U												
Selenium	61	3.3	U	3.3	U												
Silicon	5000	18500	J	18400	J												
Tin	35	2.6	U	2.6	U												
Thallium	3	4.0	U	4.0	U												
Vanadium	2.9	21.7		21.5													
Zinc	2.3	2.4		2.9													

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 0012L502

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	B110B3	Silver, Total	1.1	u	UG/L	1.1	1.0
		Aluminum, Total	26.0		UG/L	22.7	1.0
		Arsenic, Total	11.0		UG/L	2.4	1.0
		Barium, Total	99.4		UG/L	0.20	1.0
		Beryllium, Total	0.10	u	UG/L	0.10	1.0
		Calcium, Total	197000		UG/L	19.2	1.0
		Cadmium, Total	0.30	u	UG/L	0.30	1.0
		Cobalt, Total	0.90	u	UG/L	0.90	1.0
		Chromium, Total	25.2		UG/L	0.60	1.0
		Copper, Total	9.5		UG/L	0.90	1.0
		Iron, Total	44.9		UG/L	21.8	1.0
		Mercury, Total	0.10	u	UG/L	0.10	1.0
		Potassium, Total	23500		UG/L	40.9	1.0
		Magnesium, Total	58800		UG/L	6.7	1.0
		Manganese, Total	0.20	u	UG/L	0.20	1.0
		Sodium, Total	253000	J	UG/L	229	10.0
		Nickel, Total	12.1		UG/L	0.90	1.0
		Lead, Total	2.1	u	UG/L	2.1	1.0
		Antimony, Total	2.3	u	UG/L	2.3	1.0
		Selenium, Total	3.3	u	UG/L	3.3	1.0
		Silicon, Total	18400		UG/L	6.4	1.0
		Tin, Total	2.6	u	UG/L	2.6	1.0
		Thallium, Total	4.0	u	UG/L	4.0	1.0
		Vanadium, Total	21.5		UG/L	0.80	1.0
		Zinc, Total	2.9		UG/L	0.40	1.0

3/13/01

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173 RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	B110B2	Silver, Total	1.1	u	UG/L	1.1	1.0
		Aluminum, Total	22.7	u	UG/L	22.7	1.0
		Arsenic, Total	11.3		UG/L	2.4	1.0
		Barium, Total	97.7		UG/L	0.20	1.0
		Beryllium, Total	0.10	u	UG/L	0.10	1.0
		Calcium, Total	194000		UG/L	19.2	1.0
		Cadmium, Total	0.30	u	UG/L	0.30	1.0
		Cobalt, Total	0.90	u	UG/L	0.90	1.0
		Chromium, Total	40.9		UG/L	0.60	1.0
		Copper, Total	9.0		UG/L	0.90	1.0
		Iron, Total	128		UG/L	21.8	1.0
		Mercury, Total	0.10	u	UG/L	0.10	1.0
		Potassium, Total	23400		UG/L	40.9	1.0
		Magnesium, Total	57700		UG/L	6.7	1.0
		Manganese, Total	0.73		UG/L	0.20	1.0
		Sodium, Total	264000	J	UG/L	229	10.0
		Nickel, Total	13.6		UG/L	0.90	1.0
		Lead, Total	2.1	u	UG/L	2.1	1.0
		Antimony, Total	2.3	u	UG/L	2.3	1.0
		Selenium, Total	3.3	u	UG/L	3.3	1.0
		Silicon, Total	18500		UG/L	6.4	1.0
		Tin, Total	2.6	u	UG/L	2.6	1.0
		Thallium, Total	4.0	u	UG/L	4.0	1.0
		Vanadium, Total	21.7		UG/L	0.80	1.0
		Zinc, Total	2.4		UG/L	0.40	1.0

3/13/01

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B99-037
RFW#: 0012L502
SDG/SAF#: H1173/B99-037

W.O.#: 10985-001-001-9999-00
Date Received: 12-07-00

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 water samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

   All samples were reported with ten fold dilutions for Sodium due to high concentrations of this analyte.

3. All analyses were performed within the required holding times.

4. All cooler temperatures have been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury) with the exception of the ending CCVs for Beryllium, Calcium, Cadmium, Chromium, Iron, Magnesium, Manganese, Nickle, Potassium, Sodium, and Zinc. There is no impact to the data as the associated samples were surrounded by CCVs that were in control.

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.

10. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A serial dilution is performed for Mercury. A PDS was prepared at meaningful concentration levels, due to high concentrations of the following analytes:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
B110B2	Sodium	250,000	92.3

12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Pat G

J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

01-09-01
Date

gmb/m12-502

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B99-037-11	Page 1 of 2 ERT 12.5.00
lector ahlberg/Johansen	Company Contact F Roeck	Telephone No. 372-9086	Project Coordinator WEISS, RL	Price Code 7N Air Quality
ject Designation RDF Leachate Delisting Analysis	Sampling Location ERDF		SAF No. B99-037	Data Turnaround 45 Days
Chest No. RL 96-034, 039, 042 (1 of 8, 2 of 3, 3 of 3)	Field Logbook No. EL 1517-1	COA RERDF22560	Method of Shipment Fed EX	
pped To MA/RECRA RR 12.4.00	Offsite Property No. A010034		Bill of Lading/Air Bill No. 4235 7453 - 0967, 0978, 0989	

OSSIBLE SAMPLE HAZARDS/REMARKS

NONE

ecial Handling and/or Storage

SAMPLE ANALYSIS

Preservation	None	HCl to pH <2 Cool 4C	Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	Cool 4C	Cool 4C	H2SO4 to pH <2 Cool 4C	HNO3 to pH <2
Type of Container	P	aG	aG	aG	P	P	P	P	P	P
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	120mL	250mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL
	pH (Water) - 9040	TOC - 9060	Carbonyls - 8315 (Formaldehyde)	Mercury - 7470 - (CV)	Conductivity - 9050	See item (1) in Special Instructions	TDS - 160.1	TSS - 160.2	Ammonia - 350.3	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time									
~~1081~~	WATER	12.4.00	0700	RT 12.4.00								
1082	WATER	12.4.00	0945	X	X	X	X	X	X	X	X	X
1083	WATER	12.4.00	1015	X	X	X	X	X	X	X	X	X
~~1265~~	WATER	12.4.00	0945	RT 12.4.00								
~~1266~~	WATER	12.4.00	1015									

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
RFahlberg	12.4.00 1130	RThoren	12.4.00 1130
RThoren	12.4.00 1300	Stored in RL 2B 3728	12.4.00 1300
Removed from RL 2B 3728	12.5.00 0400	RThoren	12.6.00 0900
RThoren	12.5.00 0900	FEDEX	
FEDEX	12.6.00 0915		12.6.00 0915
	12.7.00 0945		12.7.00 0945

SPECIAL INSTRUCTIONS

(1) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate)
(2) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium, Silicon, Thallium, Tin)

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12/4/00

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

BORATORY SECTION	Received By	Title	Date/Time
IAL SAMPLE SPOSITION	Disposal Method	Disposed By	Date/Time

EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: BRDF			DATA PACKAGE: H1173		
VALIDATOR: TL		LAB: Recra		DATE: 3/1/01	
CASE:			SDG: H1173		
ANALYSES PERFORMED					
☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☐ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☐	☐
SAMPLES/MATRIX	B110B2	B110B3			

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments?	Yes	No	N/A
Are initial calibrations acceptable?	Yes	No	N/A
Are ICP interference checks acceptable?	Yes	No	N/A
Were ICV and CCV checks performed on all instruments?	Yes	No	N/A
Are ICV and CCV checks acceptable?	Yes	No	N/A

Comments: _____

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses?	Yes	No	N/A
Are ICB and CCB results acceptable?	Yes	No	N/A
Were preparation blanks analyzed?	Yes	No	N/A
Are preparation blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments: NO FB

5. ACCURACY

Were spike samples analyzed?	Yes	No	N/A
Are spike sample recoveries acceptable?	Yes	No	N/A
Were laboratory control samples (LCS) analyzed?	Yes	No	N/A
Are LCS recoveries acceptable?	Yes	No	N/A

Comments: Sodium J/UJ all (64.8)

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed?	(Yes)	No	N/A
Are laboratory duplicate samples RPD values acceptable?	(Yes)	No	N/A
Were ICP serial dilution samples analyzed?	Yes	No	(N/A)
Are ICP serial dilution %D values acceptable?	Yes	No	(N/A)
Are field duplicate RPD values acceptable?	Yes	No	N/A
Are field split RPD values acceptable?	Yes	No	(N/A)

Comments: Chromium 47% > FD
Iron 96% > FD

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required?	Yes	No	(N/A)
Are duplicate injection %RSD values acceptable?	Yes	No	N/A
Were analytical spikes performed as required?	Yes	No	N/A
Are analytical spike recoveries acceptable?	Yes	No	N/A
Was MSA performed as required?	Yes	No	N/A
Are MSA results acceptable?	Yes	No	N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses?	(Yes)	No	N/A
Are all results supported in the raw data?	Yes	No	(N/A)
Are results calculated properly?	Yes	No	(N/A)
Do results meet the CRDLs?	Yes	(No)	N/A

Comments: thallium, antimony, mercury

Appendix 6

Additional Documentation Requested by Client

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173 RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-003REP	B110B3	Mercury, Total	0.10u	0.10u	NC	1.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173 RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-002REP	B110B2	Silver, Total	1.1 u	1.1 u	NC	1.0
		Aluminum, Total	22.7 u	24.7	NC 200	1.0
		Arsenic, Total	11.3	9.9	13.2	1.0
		Barium, Total	97.7	99.0	1.3	1.0
		Beryllium, Total	0.10u	0.10u	NC	1.0
		Calcium, Total	194000	195000	0.65	1.0
		Cadmium, Total	0.30u	0.30u	NC	1.0
		Cobalt, Total	0.90u	0.90u	NC	1.0
		Chromium, Total	40.9	41.6	1.7	1.0
		Copper, Total	9.0	9.8	8.5	1.0
		Iron, Total	128	130	1.9	1.0
		Potassium, Total	23400	23700	1.3	1.0
		Magnesium, Total	57700	58200	0.84	1.0
		Manganese, Total	0.73	0.72	1.4	1.0
		Sodium, Total	264000	261000	1.2	10.0
		Nickel, Total	13.6	13.3	2.2	1.0
		Lead, Total	2.1 u	2.1 u	NC	1.0
		Antimony, Total	2.3 u	2.3 u	NC	1.0
		Selenium, Total	3.3 u	3.3	NC 200	1.0
		Silicon, Total	18500	18600	0.94	1.0
		Tin, Total	2.6 u	2.6 u	NC	1.0
		Thallium, Total	4.0 u	4.0 u	NC	1.0
		Vanadium, Total	21.7	21.9	0.92	1.0
		Zinc, Total	2.4	2.7	11.8	1.0

1/9/01

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173

RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-003	B110B3	Mercury, Total	0.98	0.10u	1.0	98.1	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173

RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	B110B2	Silver, Total	49.7	1.1 u	50.0	99.4	1.0
		Aluminum, Total	2050	22.7 u	2000	102.5	1.0
		Arsenic, Total	2120	11.3	2000	105.6	1.0
		Barium, Total	2050	97.7	2000	97.7	1.0
		Beryllium, Total	50.4	0.10u	50.0	100.8	1.0
		Calcium, Total	215000	194000	25000	85.0*	1.0
		Cadmium, Total	50.6	0.30u	50.0	101.2	1.0
		Cobalt, Total	487	0.90u	500	97.4	1.0
		Chromium, Total	237	40.9	200	98.2	1.0
		Copper, Total	255	9.0	250	98.3	1.0
		Iron, Total	1110	128	1000	97.9	1.0
		Potassium, Total	53800	23400	25000	121.7	1.0
		Magnesium, Total	82900	57700	25000	100.8	1.0
		Manganese, Total	503	0.73	500	100.4	1.0
		Sodium, Total	281000	264000	25000	66.8*	10.0
		Nickel, Total	486	13.6	500	94.4	1.0
		Lead, Total	498	2.1 u	500	99.5	1.0
		Antimony, Total	515	2.3 u	500	103.1	1.0
		Selenium, Total	2120	3.3 u	2000	105.8	1.0
		Silicon, Total	19300	18500	1000	85.6*	1.0
		Tin, Total	1010	2.6 u	1000	100.6	1.0
		Thallium, Total	2020	4.0 u	2000	101.1	1.0
		Vanadium, Total	522	21.7	500	100	1.0
		Zinc, Total	501	2.4	500	99.7	1.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/09/01

CLIENT: TNUHANFORD B99-037 H1173

RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L1851-MB1	Silver, Total	1.1 u	UG/L	1.1	1.0
		Aluminum, Total	22.7 u	UG/L	22.7	1.0
		Arsenic, Total	2.4 u	UG/L	2.4	1.0
		Barium, Total	0.27	UG/L	0.20	1.0
		Beryllium, Total	0.10 u	UG/L	0.10	1.0
		Calcium, Total	19.2 u	UG/L	19.2	1.0
		Cadmium, Total	0.30 u	UG/L	0.30	1.0
		Cobalt, Total	0.90 u	UG/L	0.90	1.0
		Chromium, Total	0.60 u	UG/L	0.60	1.0
		Copper, Total	0.90 u	UG/L	0.90	1.0
		Iron, Total	21.8 u	UG/L	21.8	1.0
		Potassium, Total	40.9 u	UG/L	40.9	1.0
		Magnesium, Total	8.8	UG/L	6.7	1.0
		Manganese, Total	0.20 u	UG/L	0.20	1.0
		Sodium, Total	22.9 u	UG/L	22.9	1.0
		Nickel, Total	0.90 u	UG/L	0.90	1.0
		Lead, Total	2.1 u	UG/L	2.1	1.0
		Antimony, Total	2.3 u	UG/L	2.3	1.0
		Selenium, Total	3.3 u	UG/L	3.3	1.0
		Silicon, Total	6.5	UG/L	6.4	1.0
		Tin, Total	2.6 u	UG/L	2.6	1.0
		Thallium, Total	4.0 u	UG/L	4.0	1.0
		Vanadium, Total	0.80 u	UG/L	0.80	1.0
		Zinc, Total	0.40 u	UG/L	0.40	1.0
BLANK1	00C0435-MB1	Mercury, Total	0.10 u	UG/L	0.10	1.0
BLANK2	00C0435-MB2	Mercury, TCLP Leachate	0.10 u	UG/L	0.10	1.0

Date: 15 March 2001
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF Leachate Delisting Analysis
Subject: Radiochemistry - Data Package No. H1173-ES (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-ES which was prepared by Eberline Services (ES). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/14/00	Water	C	See note 1 & 2
B110B3	12/14/00	Water	C	See note 1
B11266	12/14/00	Water	C	See note 2

1 - Gamma spectroscopy; gross alpha and beta;
2 - Carbon-14; technetium-99; and total uranium.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times**

  Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Laboratory (Method) Blanks**

  Laboratory Blanks

  Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the required detection limit (RDL), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the minimum detectable activity (MDA) are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

  All laboratory blank results were acceptable.

  Field Blanks

  No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

  Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

  Due to the LCS not being analyzed with the SDG, all technetium-99 results were qualified as estimates and flagged "J".

  All other accuracy results were acceptable.

- **Precision**

  Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than 20 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

  Due to RPDs outside QC limits, all gross alpha (86%) and carbon-14 (169%) results were qualified as estimates and flagged "J".

  All other duplicate results were acceptable.

  Field Duplicate Samples

  One pair of field duplicate samples (samples B110B2/B110B3) were submitted to ES for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPDs for gross alpha (25%) was outside QC limits. Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Detection Levels**

  Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

  Data package No. H1173-ES (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to RPDs outside QC limits, all gross alpha (86%) and carbon-14 (169%) results were qualified as estimates and flagged "J". Due to the LCS not being analyzed with the SDG, all technetium-99 results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE *Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary*, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Gross alpha Carbon-14	J	All	RPD
Technetium-99	J	All	LCS not analyzed w/SDG

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, WATER MATRIX, (PCi/L)

Project: BECHTEL-HANFORD																					
Laboratory: TR																					
Case	SDG: H1173																				
Sample Number		B110B2		B110B3		B11266															
Remarks				Duplicate																	
Sample Date		12/04/00		12/04/00		12/04/01															
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Gross Alpha	3	47.9	J	62.2	J	not analyzed															
Gross Beta	4	229		281		not analyzed															
Carbon-14		-6.76	UJ	not analyzed		51.1	J														
Technetium-99		675	J	not analyzed		770	J														
Total Uranium (ug/L)		224		not analyzed		288															
Potassium-40		U	U	U	U	not analyzed															
Cobalt 60	25	U	U	U	U	not analyzed															
Cesium 137	15	U	U	U	U	not analyzed															
Radium-226		U	U	U	U	not analyzed															
Radium-228		U	U	U	U	not analyzed															
Europium 152	50	U	U	U	U	not analyzed															
Europium 154	50	U	U	U	U	not analyzed															
Europium 155	50	U	U	U	U	not analyzed															
Thorium-228		U	U	U	U	not analyzed															
Thorium-232		U	U	U	U	not analyzed															
Americium-241		U	U	U	U	not analyzed															
Uranium-238		U	U	U	U	not analyzed															
Uranium-235		U	U	U	U	not analyzed															

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

R012038-01

TMA / RICHMOND
SAMPLE DELIVERY GROUP H1173

DATA SHEET

B110B2

SDG 7588
Contact Melissa C. Mannion

Client/Case no Hanford SDG H1173
Contract TRC-SBB-207925

Lab sample id R012038-01
Dept sample id 7588-001
Received 12/06/00

Client sample id B110B2
Location/Matrix ERDF WATER
Collected 12/04/00 09:45
Custody/SAF No B99-037-11 B99-037

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Gross Alpha	12587-46-1	47.9	9.2	3.4	3.0	J	93A
Gross Beta	12587-47-2	229	6.5	2.1	4.0		93B
Carbon 14	14762-75-5	-6.76	27	45	200	U J	C
Technetium 99	14133-76-7	675	31	11	15	J	TC
Total Uranium (ug/L)	7440-61-1	224	27	1.6	0.10		U_T
Potassium 40	13966-00-2	U		250		U	GAM
Cobalt 60	10198-40-0	U		12	25	U	GAM
Cesium 137	10045-97-3	U		13	15	U	GAM
Radium 226	13982-63-3	U		23		U	GAM
Radium 228	15262-20-1	U		51		U	GAM
Europium 152	14683-23-9	U		33	50	U	GAM
Europium 154	15585-10-1	U		43	50	U	GAM
Europium 155	14391-16-3	U		46	50	U	GAM
Thorium 228	14274-82-9	U		19		U	GAM
Thorium 232	TH-232	U		51		U	GAM
Uranium 235	15117-96-1	U		51		U	GAM
Uranium 238	U-238	U		1400		U	GAM
Americium 241	14596-10-2	U		94		U	GAM

ERDF Leachate Delisting Analysis

RV 3/13/01

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 01/20/01

R012038-02

TMA / RICHMOND
SAMPLE DELIVERY GROUP H1173

DATA SHEET

B110B3

SDG	7588	Client/Case no	Hanford SDG H1173
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R012038-02	Client sample id	B110B3
Dept sample id	7588-002	Location/Matrix	ERDF WATER
Received	12/06/00	Collected	12/04/00 10:15
		Custody/SAF No	B99-037-11 B99-037

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	62.2	11	4.8	3.0	J	93A
Gross Beta	12587-47-2	281	7.2	2.1	4.0		93B
Potassium 40	13966-00-2	U		440		U	GAM
Cobalt 60	10198-40-0	U		16	25	U	GAM
Cesium 137	10045-97-3	U		15	15	U	GAM
Radium 226	13982-63-3	U		34		U	GAM
Radium 228	15262-20-1	U		71		U	GAM
Europium 152	14683-23-9	U		36	50	U	GAM
Europium 154	15585-10-1	U		44	50	U	GAM
Europium 155	14391-16-3	U		33	50	U	GAM
Thorium 228	14274-82-9	U		21		U	GAM
Thorium 232	TH-232	U		71		U	GAM
Uranium 235	15117-96-1	U		49		U	GAM
Uranium 238	U-238	U		1700		U	GAM
Americium 241	14596-10-2	U		16		U	GAM

ERDF Leachate Delisting Analysis

3/13/01

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/20/01

TMA / RICHMOND
SAMPLE DELIVERY GROUP H1173

R012038-03

B11266

DATA SHEET

SDG	7588	Client/Case no	Hanford SDG H1173
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R012038-03	Client sample id	B11266
Dept sample id	7588-003	Location/Matrix	ERDF WATER
Received	12/06/00	Collected	12/04/00 10:15
		Custody/SAF No	B99-037-11 B99-037

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Carbon 14	14762-75-5	51.1	32	51	200	~~J~~ J	C
Technetium 99	14133-76-7	770	27	11	15	J	TC
Total Uranium (ug/L)	7440-61-1	288	35	1.6	0.10		U_T

ERDF Leachate Delisting Analysis

3/13/01

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/20/01

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1173 was composed of three water samples designated under SAF No. B99-037 with a Project Designation of: ERDF Leachate Delisting Analysis.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analyses

The RPD difference between sample B110B3 and its sample duplicate for gross alpha analysis was 86%, greater than the 3σ limit of 65%. No other problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

The LCS percent recovery (81%) was below the 3σ limits (86 to 114%), but within the laboratory protocol limits (80 to 120%). The MS percent recovery (83%) was also below the 3σ limits (86 to 114%), but within the laboratory protocol limits (80 to 120%). No other problems were encountered during the course of the analyses.

2.3 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.4 Total Uranium Analyses

No problems were encountered during the course of the analyses.

2.5 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa Mannion — 1/20/01

Melissa C. Mannion
Program Manager

Date

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-037-11	Page ~~5 of 6~~ 3 of 3 RT 12.4.00
Collector: Fahlberg/Johansen	Company Contact: F Roeck; Telephone No.: 372-9086	Project Coordinator: WEISS, RL	Price Code 7N; Data Turnaround 45 Days
Project Designation: ERDF Leachate Delisting Analysis	Sampling Location: ERDF H1173 (7588)	SAF No.: B99-037	Air Quality ☐
Ice Chest No.: ERC99-065 (1 of 1)	Field Logbook No.: EL 1517-1; COA: RERDF22560	Method of Shipment: Fed EX	
Shipped To: TMA/RECRA	Offsite Property No.: A11005	Bill of Lading/Air Bill No.: 4235 7953-0990	

POSSIBLE SAMPLE HAZARDS/REMARKS: NONE

Special Handling and/or Storage

Preservation			HCL to pH <2 Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	HCl Cool 4C
Type of Container			aG	P	aGs*	aGs*	aGs*
No. of Container(s)			2	2	3	3	3
Volume			Delete RT 12.4.00 1000mL	1000mL	40mL	40mL	Delete RT 12.4.00 40mL
SAMPLE ANALYSIS			oil & Grease 9070	Gross Alpha; Gross Beta	Alcohols, Glycols, & Ketones - 8015 (RT 12.1.00)	Alcohols, Glycols, & Ketones - 8015 (1-Butanol, Methanol)	See item (1) in Special Instructions.
Sample No.	**Matrix***	**Sample Date**	**Sample Time**				
~~B110B1~~ 12.04.00 RT	~~WATER~~	~~12.4.00~~	~~0700~~				
B110B2 ✓	WATER ✓	12.4.00 ✓	0945		X ✓		
B110B3 ✓	WATER	12.4.00	1015		X ✓		
~~B11265~~	~~WATER~~	~~12.4.00~~	~~0945~~	RT 12.4.00			
~~B11266~~	~~WATER~~	~~12.4.00~~	~~1015~~				

CHAIN OF POSSESSION	Date/Time	Sign/Print Names Received By	Date/Time
Relinquished By R. Fahlberg / R. Fahlberg	12.4.00 1130	R. Thoren / R Thoren	12.04.00 1130
Relinquished By R. Thoren / R Thoren	12.4.00 1300	Stored in Ref 2B 3728 12.4.00	12.4.00 1300
Relinquished By Removed from Ref 2B 3728 12.5.00	0900	R. Thoren / R Thoren	12.5.00 0900
Relinquished By R. Thoren / R Thoren	12.5.00 0900	FED EX	12-05-00
Relinquished By FED-EXPRESS	12-05-00 10 AM	E. Aguero	12-06-00 10 AM
Relinquished By		Received By	

SPECIAL INSTRUCTIONS

~~(1) VOA - 8260A (App IX); VOA - 8260A (App IX Add-On) (1,1,2-Trichloro-1,2,2-trifluoroethane, 1,3-Butadiene, 1-Butanol, 2-Chloroethyl vinyl ether, Allyl alcohol, cis-1,2-Dichloroethylene, Crotonaldehyde, Dichloropropanol, Diethyl ether, Ethyl acetate, Isoprop~~ RT 12.4.00

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES. RT 12.4.00

Matrix *: S=Soil, SE=Sediment, SO=Solid, S=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

000025

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-037-11 | Page 1 of 3

Collector: Fahlberg/Johansen	Company Contact: F Roeck	Telephone No.: 372-9086	Project Coordinator: WEISS, RL
Project Designation: ERDF Leachate Delisting Analysis	Sampling Location: ERDF H1173 (7588)		SAF No.: B99-037
Ice Chest No.: ERC 99-065 (1 of 1)	Field Logbook No.: EL 1517-1	COA: RERDF22560	Method of Shipment: Fed EX
Shipped To: TMA/~~REGRA~~ RA 12.4.00	Offsite Property No.: A#10815		Bill of Lading/Air Bill No.: 4235 1753 - 0990

Price Code: 7N | Data Turnaround: 45 Days | Air Quality ☐

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Preservation	None	HCl to pH <2 Cool 4C	Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	Cool 4C	Cool 4C	H2SO4 to pH <2 Cool 4C	HNO3 to pH <2
Type of Container	P	aG	aG	aG	P	P	P	P	P	P
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	120mL	250mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	pH (Water) - 9040	TOC - 9060	Carbonyls - 8315 (Formaldehyde)	Mercury - 7470 - (CV)	Conductivity - 9050	See item (1) in Special Instructions.	TDS - 160.1	TSS - 160.2	Ammonia - 350.3	See item (2) in Special Instructions.
~~B11081~~ 12.4.00	WATER	12.4.00	0700										
B11082	WATER	12.4.00	0945	RT									
B11083	WATER	12.4.00	1015	12.4.00									
B11265	WATER	12.4.00	0945										
B11266	WATER	12.4.00	1015										

NO Sample

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
R Fahlberg / R Fahlberg	12.4.00 1130	R. Thoren	12.4.00 1130
R Thoren	12.4.00 1300	Stored in R4 2B 3728	12.4.00 1300
Removed from R4 2B 3728	12.5.00 0900	R. Thoren	12.5.00 0900
R. Thoren	12.5.00 0900	FED EX	12-05-00
FED-EXPRESS	12-06-00 10:4m	E. Segura	12-06-00 10:4m

Sign/Print Names

SPECIAL INSTRUCTIONS

~~(1) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate)~~
~~(2) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium, Silicon, Thallium, Tin)~~

RT 12/4/00

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12/4/00

Matrix *
S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By / Date/Time

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-037-11 | Page ~~1 of 6~~ 2 OF 3 RT 12.4

Collector: Fahlberg/Johansen	Company Contact: F Roeck — Telephone No. 372-9086	Project Coordinator: WEISS, RL	Price Code 7N — Data Turnaround 45 Days
Project Designation: ERDF Leachate Delisting Analysis	Sampling Location: ERDF H1173 (7588)	SAF No. B99-037	Air Quality ☐
Ice Chest No. ERC 99-065	Field Logbook No. EL 1517-1 — COA RERDF22560	Method of Shipment: Fed EX	
Shipped To: ~~TMA/REGRA~~ RT 12.4.00	Offsite Property No. A010015	Bill of Lading/Air Bill No. 42357953-0990	

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Preservation	HNO3 to pH <2	ZnAc+NaOH to pH >9 Cool	HCl to pH <2	HNO3 to pH <2	NaOH to pH >= 12 Cool 4C	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C
Type of Container	P	P (Delete)	P	P	P	P	aG	aG	aG	aG
No. of Container(s)	1	RT 12.4.00	1	1	Delete RT 12.4.00	1	2	2	2	2
Volume	500mL	500mL	1000mL	1000mL	1000mL	1000mL	1000mL	1000mL	1000mL	1000mL
SAMPLE ANALYSIS	Total Uranium	Sulfides - 9030	Technetium-99	See item (1) in Special Instructions.	Total Cyanide - 9010	Carbon-14	See item (2) in Special Instructions.	Chloro-Herbicides EPA8151	Pest/PCBs - 8081	See item (3) in Special Instructions.

(Columns from "See item (2)" through "See item (3)" crossed out: Delete RT 12.4.00)

Sample No.	Matrix *	Sample Date	Sample Time	Total Uranium	Sulfides - 9030	Technetium-99	See item (1)	Total Cyanide	Carbon-14	See item (2)	Chloro-Herbicides	Pest/PCBs	See item (3)
~~B110B1~~ RT 12.7.4.00	~~WATER~~	~~12.4.00~~	~~0700~~	mm 12/7/00									
B110B2	WATER	12.4.00	0945	X		X	X		X				
B110B3	WATER	12.4.00	1015				X						
~~B11265~~	~~WATER~~	~~12.4.00~~	~~0945~~	X		X			X → NOT RECEIVED				
B11266	WATER	12.4.00	1015	X		X			X				

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R Fahlberg / R. Fahlberg	12.4.00 1130	R.T / R. Thoren	12.4.00 1130
R.T / R. Thoren	12.4.00 1300	Stored in RL 2B 3728 12.4.00	12.4.00 1300
Removed from RL of 2B 3728	12.5.00 0900	R.T / R. Thoren	12.5.00 0900
R.T / R. Thoren	12.5.00 0900	FED EX	12-05-00
FED. EXP RESS	12-06-00	E. Segura	12-06-00 10:am

SPECIAL INSTRUCTIONS

(1) Gamma Spectroscopy(Water) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

~~(2) 8310_SVOA_HPLC (Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene)~~ RT 12.4.00

~~(3) Semi-VOA - 8270A (App IX); Semi-VOA - 8270A (App IX Add-On) (1,2-Diphenylhydrazine, 1,4-Dinitrobenzene, 1-Acetyl-2-thiourea, 2,3-Diaminotoluene, 2-Cyclohexyl-4,6-dinitrophenol)~~

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES. RT 12.4.00

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W = Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: ERDF			DATA PACKAGE: H1173		
VALIDATOR: TLI		LAB: EBerline		DATE: 3/1/01	
CASE:			SDG: H1173		

ANALYSES PERFORMED

☒ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	☐ Alpha Spectroscopy	☒ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☐ Tritium	☒ tot-uranium	XCN	XTC99

SAMPLES/MATRIX B110B2 B110B3

water

1. Completeness . . . . . ☒ N/A

Technical verification forms present? . . . . . Yes No N/A

Comments:_____

2. Initial Calibration . . . . . ☒ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . Yes No N/A

Initial calibration acceptable? . . . . . Yes No N/A

Standards NIST traceable? . . . . . Yes No N/A

Standards Expired? . . . . . Yes No N/A

Comments:_____

3. Continuing Calibration . . . . . ☒ N/A

Calibration checked within one week of sample analysis? . . .	Yes	No	N/A
Calibration check acceptable?	Yes	No	N/A
Calibration check standards NIST traceable?	Yes	No	N/A
Calibration check standards expired?	Yes	No	N/A

Comments:_____

4. Blanks . . . . . ☐ N/A

Method blank analyzed?	(Yes)	No	N/A
Method blank results acceptable?	(Yes)	No	N/A
Analytes detected in method blank?	Yes	(No)	N/A
Field blank(s) analyzed?	Yes	(No)	N/A
Field blank results acceptable?	Yes	No	(N/A)
Analytes detected in field blank(s)?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: NO FB

5. Matrix Spikes . . . . . ☐ N/A

Matrix spike analyzed?	(Yes)	No	N/A
Spike recoveries acceptable?	(Yes)	No	N/A
Spike source traceable?	Yes	No	(N/A)
Spike source expired?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments:_____

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed? . . . . . (Yes) No N/A
LCS recoveries acceptable? . . . . . (Yes) No N/A
LCS traceable? . . . . . Yes No (N/A)
Transcription/Calculation Errors? . . . . . Yes No (N/A)

Comments: LCS not analyzed w/SDG TC-99 J/UJ

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added? . . . . . (Yes) No N/A
Chemical recovery acceptable? . . . . . (Yes) No N/A
Chemical carrier traceable? . . . . . Yes No (N/A)
Chemical carrier expired? . . . . . Yes No (N/A)
Transcription/Calculation errors? . . . . . Yes No (N/A)

Comments:

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed? . . . . . (Yes) No N/A
RPD Values Acceptable? . . . . . Yes (No) N/A
Transcription/Calculation Errors? . . . . . Yes No (N/A)

Comments: gr A - J all
check (CIC) 16920 Jall

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed?	(Yes)	No	N/A
Field duplicate RPD values acceptable?	Yes	(No)	N/A
Field split sample(s) analyzed?	Yes	(No)	N/A
Field split RPD values acceptable?	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	(No)	N/A
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments: QA 2570
NO Split or perform audit

10. Holding Times

Are sample holding times acceptable?	(Yes)	No	N/A

Comments:

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses?	(Yes)	No	N/A
Results supported in raw data?	Yes	No	(N/A)
Results Acceptable?	(Yes)	No	N/A
Transcription/Calculation errors?	Yes	No	(N/A)
MDA's meet required detection limits?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	(N/A)

Comments:

Appendix 6

Additional Documentation Requested by Client

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1173

R012038-08

B11266

MATRIX SPIKE

SDG 7588
Contact Melissa C. Mannion
MATRIX SPIKE
Lab sample id R012038-08
Dept sample id 7588-008

ORIGINAL
Lab sample id R012038-03
Dept sample id 7588-003
Received 12/06/00

Client/Case no Hanford SDG H1173
Case no TRC-SBB-207925
Client sample id B11266
Location/Matrix ERDF WATER
Collected 12/04/00 10:15
Custody/SAF No B99-037-11 B99-037

ANALYTE	SPIKE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	ORIGINAL pCi/L	2σ ERR (COUNT)	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Carbon 14	53000	540	140	200	X	C	63800	2600	51.1	32	83	86-114	60-140

ERDF Leachate Delisting Analysis

QC-MS#3 37013

MATRIX SPIKES
Page 1
SUMMARY DATA SECTION
Page 12

000024

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-MS
Version 3.06
Report date 01/20/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1173

R012038-07

B11266

DUPLICATE

SDG 7588
Contact Melissa C. Mannion

DUPLICATE
Lab sample id R012038-07
Dept sample id 7588-007

ORIGINAL
Lab sample id R012038-03
Dept sample id 7588-003
Received 12/06/00

Client/Case no Hanford SDG H1173
Case no TRC-SBB-207925
Client sample id B11266
Location/Matrix ERDF WATER
Collected 12/04/00 10:15
Custody/SAF No B99-037-11 B99-037

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Carbon 14	4.29	28	46	200	U	C	51.1	32	51	J	169	232
Technetium 99	791	38	12	15		TC	770	27	11		3	23
Total Uranium (ug/L)	279	33	1.6	0.10		U_T	288	35	1.6		3	32

ERDF Leachate Delisting Analysis

QC-DUP#3 37012

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 01/20/01

000065

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1173

R012038-06

B11083

DUPLICATE

SDG 7588
Contact Melissa C. Mannion

DUPLICATE
Lab sample id R012038-06
Dept sample id 7588-006

ORIGINAL
Lab sample id R012038-02
Dept sample id 7588-002
Received 12/06/00

Client/Case no Hanford SDG H1173
Case no TRC-SBB-207925

Client sample id B11083
Location/Matrix ERDF WATER
Collected 12/04/00 10:15
Custody/SAF No B99-037-11 B99-037

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD -%	3σ PROT TOT LIMIT
Gross Alpha	24.8	7.5	4.6	3.0		93A	62.2	11	4.8		86	65
Gross Beta	268	7.0	2.2	4.0		93B	281	7.2	2.1		5	32
Potassium 40	U		290		U	GAM	U		440	U	-	
Cobalt 60	U		20	25	U	GAM	U		16	U	-	
Cesium 137	U		17	15	U	GAM	U		15	U	-	
Radium 226	U		28		U	GAM	U		34	U	-	
Radium 228	U		71		U	GAM	U		71	U	-	
Europium 152	U		29	50	U	GAM	U		36	U	-	
Europium 154	U		47	50	U	GAM	U		44	U	-	
Europium 155	U		21	50	U	GAM	U		33	U	-	
Thorium 228	U		16		U	GAM	U		21	U	-	
Thorium 232	U		71		U	GAM	U		71	U	-	
Uranium 235	U		59		U	GAM	U		49	U	-	
Uranium 238	U		2200		U	GAM	U		1700	U	-	
Americium 241	U		14		U	GAM	U		16	U	-	

ERDF Leachate Delisting Analysis

QC-DUP#2 37011

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 01/20/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1173

R012038-04

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7588
Contact Melissa C. Mannion

Client/Case no Hanford SDG H1173
Case no TRC-SBB-207925

Lab sample id R012038-04
Dept sample id 7588-004

Client sample id Lab Control Sample
Material/Matrix WATER
SAF No B99-037

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	67.6	5.2	1.3	3.0		93A	71.7	2.9	94	69-131	70-130
Gross Beta	76.8	3.8	2.4	4.0		93B	80.7	3.2	95	77-123	70-130
Carbon 14	17300	180	62	200		C	21300	850	81	86-114	80-120
Technetium 99	2630	88	9.2	15		TC	2620	100	100	83-117	80-120
Total Uranium (ug/L)	84.5	9.6	0.16	0.10		U_T	82.5	3.3	102	77-123	80-120
Cobalt 60	442	43	22	25		GAM	468	19	94	74-126	80-120
Cesium 137	510	41	35	15		GAM	554	22	92	76-124	80-120

ERDF Leachate Delisting Analysis

QC-LCS 37009

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 01/20/01

TMA / RICHMOND
SAMPLE DELIVERY GROUP H1173

R012038-05

Method Blank

METHOD BLANK

SDG 7588 | Client/Case no Hanford | SDG H1173
Contact Melissa C. Mannion | Contract TRC-SBB-207925

Lab sample id R012038-05 | Client sample id Method Blank
Dept sample id 7588-005 | Material/Matrix WATER
SAF No B99-037

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	-0.294	0.58	1.2	3.0	U	93A
Gross Beta	12587-47-2	-0.261	1.0	1.8	4.0	U	93B
Carbon 14	14762-75-5	-10.2	27	46	200	U	C
Technetium 99	14133-76-7	-2.83	4.0	11	15	U	TC
Total Uranium (ug/L)	7440-61-1	0	0.007	0.016	0.10	U	U_T
Potassium 40	13966-00-2	U		140		U	GAM
Cobalt 60	10198-40-0	U		17	25	U	GAM
Cesium 137	10045-97-3	U		13	15	U	GAM
Radium 226	13982-63-3	U		23		U	GAM
Radium 228	15262-20-1	U		51		U	GAM
Europium 152	14683-23-9	U		26	50	U	GAM
Europium 154	15585-10-1	U		42	50	U	GAM
Europium 155	14391-16-3	U		17	50	U	GAM
Thorium 228	14274-82-9	U		12		U	GAM
Thorium 232	TH-232	U		51		U	GAM
Uranium 235	15117-96-1	U		35		U	GAM
Uranium 238	U-238	U		1600		U	GAM
Americium 241	14596-10-2	U		11		U	GAM

ERDF Leachate Delisting Analysis

QC-BLANK 37010

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 01/20/01

Date: 15 March 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF Leachate Delisting Analysis
Subject: PCBs, Pesticides and Herbicides - Data Package No. H1173-RLN (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/4/00	Water	C	See note 1
B110B3	12/4/00	Water	C	See note 1

1 - Pesticides/PCBs by 8081 and herbicides by 8151.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Water samples must be extracted within 7 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR".

All holding times were met.

- **Method Blanks**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than contract required quantitation limit (CRQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than CRQL, the result is qualified as undetected and elevated to the CRQL.

All method blank target compound results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike analyses are performed in duplicate and must be within control limits of 50% to 150%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Nondetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to sample not being analyzed with the matrix spike, all pesticide/PCB results in sample B110B2 were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Nondetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Nondetected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. The RPD for liquid samples is $\leq$20% and $\leq$35% for soils. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

  Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs), to ensure that laboratory detection levels meet the required criteria. The following analytes had laboratory reported detection limits above the analyte specific PQLs:

alpha-BHC	beta-BHC	heptachlor
aldrin	toxaphene	dieldrin
4,4'-DDE	endrin	4,4'-DDD
4,4'-DDT	gamma-BHC (lindane)	heptachlor epoxide
Aroclor-1221		

Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

  Data package No. H1173-RLN (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to sample not being analyzed with the matrix spike, all pesticide/PCB results in sample B110B2 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following analytes had laboratory reported detection limits above the analyte specific PQLs:

alpha-BHC	beta-BHC	heptachlor
aldrin	toxaphene	dieldrin

4,4'-DDE	endrin	4,4'-DDD
4,4'-DDT	gamma-BHC (lindane)	heptachlor epoxide
Aroclor-1221		

Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE *Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary*, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Pesticides PCBs	J	B110B2	Sample not analyzed w/LCS

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

PEST/PCB/HERBICIDE ANALYSIS, WATER MATRIX, (UG/L)

Project: BECHTEL-HANFORD																	
Laboratory: Recra LabNet																	
Case	SDG: H1173																
Sample Number		B110B2		B110B3													
Remarks				Duplicate													
Sample Date		12/04/00		12/04/00													
Pest/PCB	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Alpha-BHC	0.01	0.061	UJ	0.055	U												
Beta-BHC	0.019	0.061	UJ	0.055	U												
Delta-BHC		0.061	UJ	0.055	U												
Gamma-BHC (Lindane)	0.009	0.061	UJ	0.055	U												
Heptachlor	0.011	0.061	UJ	0.055	U												
Aldrin	0.01	0.061	UJ	0.055	U												
Heptachlor Epoxide	0.01	0.061	UJ	0.055	U												
Endosulfan I		0.061	UJ	0.055	U												
Dieldrin	0.02	0.12	UJ	0.11	U												
4,4'-DDE	0.01	0.12	UJ	0.11	U												
Endrin	0.02	0.12	UJ	0.11	U												
Endosulfan II		0.12	UJ	0.11	U												
4,4'-DDD	0.01	0.12	UJ	0.11	U												
Endosulfan Sulfate		0.12	UJ	0.11	U												
4,4'-DDT	0.01	0.12	UJ	0.11	U												
Methoxychlor		0.61	UJ	0.55	U												
Endrin Ketone		0.12	UJ	0.11	U												
Endrin Aldehyde		0.12	UJ	0.11	U												
alpha-Chlordane		0.061	UJ	0.055	U												
gamma-Chlordane		0.061	UJ	0.055	U												
Toxaphene	0.2	6.1	UJ	5.5	U												
Aroclor-1016	2	1.2	UJ	1.1	U												
Aroclor-1221	2	2.4	UJ	2.2	U												
Aroclor-1232	2	1.2	UJ	1.1	U												
Arochlor-1242	2	1.2	UJ	1.1	U												
Arochlor-1248	2	1.2	UJ	1.1	U												
Arochlor-1254	2	1.2	UJ	1.1	U												
Arochlor-1260	2	1.2	UJ	1.1	U												
Herbicides by 8151																	
Dalapon		5.2	UJ	5.2	UJ												
Dicamba		2.1	UJ	2.1	UJ												
Dichloroprop		5.2	UJ	5.2	UJ												
2,4-D	4	1.0	UJ	1.0	UJ												
2,4,5-TP (Silvex)		0.52	UJ	0.50	UJ												
2,4,5-T		0.52	UJ	0.52	UJ												
2,4-DB		5.2	UJ	5.2	UJ												
Dinoseb		0.52	UJ	0.52	UJ												

Recra LabNet - Lionville Laboratory
Pesticide/PCBs by GC, CLP List
Report Date: 01/03/01 09:52

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1

	Cust ID:	B110B2	B110B2	B110B2	B110B3	PBLKKC	PBLKKC BS
Sample Information	RFW#:	002	002 MS	002 MSD	003	00LE1618-MB1	00LE1618-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Surrogate:	Decachlorobiphenyl	67 %	68 %	75 %	54 %	85 %	61 %
	Tetrachloro-m-xylene	88 %	62 %	68 %	70 %	80 %	85 %
		fl	fl	fl	fl	fl	fl
Alpha-BHC		0.061 U J	0.10 U	0.10 U	0.055 U	0.050 U	0.050 U
Beta-BHC		0.061 U	0.10 U	0.10 U	0.055 U	0.050 U	0.050 U
Delta-BHC		0.061 U	0.10 U	0.10 U	0.055 U	0.050 U	0.050 U
gamma-BHC (Lindane)		0.061 U	70 %	70 %	0.055 U	0.050 U	85 %
Heptachlor		0.061 U	75 %	75 %	0.055 U	0.050 U	95 %
Aldrin		0.061 U	70 %	70 %	0.055 U	0.050 U	85 %
Heptachlor epoxide		0.061 U	0.10 U	0.10 U	0.055 U	0.050 U	0.050 U
Endosulfan I		0.061 U	0.10 U	0.10 U	0.055 U	0.050 U	0.050 U
Dieldrin		0.12 U	82 %	80 %	0.11 U	0.10 U	100 %
4,4'-DDE		0.12 U	0.21 U	0.21 U	0.11 U	0.10 U	0.10 U
Endrin		0.12 U	88 %	94 %	0.11 U	0.10 U	118 %
Endosulfan II		0.12 U	0.21 U	0.21 U	0.11 U	0.10 U	0.10 U
4,4'-DDD		0.12 U	0.21 U	0.21 U	0.11 U	0.10 U	0.10 U
Endosulfan sulfate		0.12 U	0.21 U	0.21 U	0.11 U	0.10 U	0.10 U
4,4'-DDT		0.12 U	90 %	88 %	0.11 U	0.10 U	110 %
Methoxychlor		0.61 U	1.0 U	1.0 U	0.55 U	0.50 U	0.50 U
Endrin ketone		0.12 U	0.21 U	0.21 U	0.11 U	0.10 U	0.10 U
Endrin aldehyde		0.12 U	0.21 U	0.21 U	0.11 U	0.10 U	0.10 U
alpha-Chlordane		0.061 U	0.10 U	0.10 U	0.055 U	0.050 U	0.050 U
gamma-Chlordane		0.061 U	0.10 U	0.10 U	0.055 U	0.050 U	0.050 U
Toxaphene		6.1 U	10 U	10 U	5.5 U	5.0 U	5.0 U
Aroclor-1016		1.2 U	2.1 U	2.1 U	1.1 U	1.0 U	1.0 U
Aroclor-1221		2.4 U	4.1 U	4.1 U	2.2 U	2.0 U	2.0 U
Aroclor-1232		1.2 U	2.1 U	2.1 U	1.1 U	1.0 U	1.0 U
Aroclor-1242		1.2 U	2.1 U	2.1 U	1.1 U	1.0 U	1.0 U
Aroclor-1248		1.2 U	2.1 U	2.1 U	1.1 U	1.0 U	1.0 U
Aroclor-1254		1.2 U	2.1 U	2.1 U	1.1 U	1.0 U	1.0 U
Aroclor-1260		1.2 U	2.1 U	2.1 U	1.1 U	1.0 U	1.0 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Recra LabNet - Lionville Laboratory
Herbicides, Special List
Report Date: 01/18/01 13:5

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1

	Cust ID:	B110B2	B110B2	B110B2	B110B3	PBLKJY	PBLKJY BS
Sample Information	RFW#:	002	002 MS	002 MSD	003	00LE1617-MB1	00LE1617-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

Surrogate:	DCAA	109 %	114 %	110 %	113 %	105 %	112 %
		fl	fl	fl	fl	fl	fl
Dalapon		5.4 U	85 %	75 %	5.2 U	5.0 U	81 %
Dicamba		2.2 U	123 %	125 %	2.1 U	2.0 U	127 %
Dichloroprop		5.4 U	104 %	96 %	5.2 U	5.0 U	103 %
2,4-D		1.1 U	108 %	96 %	1.0 U	1.0 U	112 %
2,4,5-TP (Silvex)		0.54 U	118 %	118 %	0.52 U	0.50 U	108 %
2,4,5-T		0.54 U	132 %	116 %	0.52 U	0.50 U	130 %
2,4-DB		5.4 U	159 %	150 %	5.2 U	5.0 U	158 %
Dinoseb		0.54 U	119 %	117 %	0.52 U	0.50 U	117 %

01-2501

3/13/01

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU HANFORD B99-037
RFW#: 0012L502
SDG/SAF#: H1173/B99-037

W.O.#: 10985-001-001-9999-00
Date Received: 12-07-00

PESTICIDE

The set of samples consisted of two (2) water samples collected on 12-04-00.

The samples and their associated QC samples were extracted on 12-10-00 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 12-24,28-00. The extraction procedure was based on method 3520 and the extracts were analyzed based on method 8081.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

by _____
J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

01-11-01
Date

pef\r:\group\data\pest\12L-502.pes

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU HANFORD B99-037
RFW#: 0012L502
SDG/SAF#: H1173/B99-037

W.O.#: 10985-001-001-9999-00
Date Received: 12-07-00

HERBICIDE

The set of samples consisted of two (2) water samples collected on 12-04-00.

The samples and their associated QC samples were extracted on 12-08-00 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 01-11-01. The extraction and analysis procedure was based on method 8151.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

By _____ 01-26-01
J. Michael Taylor — Date
VP, Laboratory General Manager
Lionville Laboratory

pef\r:\group\data\herb\tnu\\12L-502.her

W12C 413 3 of 5

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-037-11	Page 5 of 6

Collector: Fahlberg/Johansen	Company Contact: F Roeck; Telephone No.: 372-9086	Project Coordinator: WEISS, RL	Price Code 7N; Data Turnaround 45 Days
Project Designation: ERDF Leachate Delisting Analysis	Sampling Location: ERDF	SAF No.: B99-037	Air Quality
Ice Chest No.: ERCA6-034,039,042	Field Logbook No.: EL 1517-1; COA: RERDF22560	Method of Shipment: Fed EX	
Shipped To: TMA/RECRA RT 12.4.00	Offsite Property No.: A010034	Bill of Lading/Air Bill No.: 42357453-0967,0978,0989	

POSSIBLE SAMPLE HAZARDS/REMARKS: None

Special Handling and/or Storage

Preservation	HCL to pH <2 Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	HCl Cool 4C
Type of Container	aG	P	aGs*	aGs*	aGs*
No. of Container(s)	2		3	3	3
Volume	1000mL	1000mL	40mL	40mL	40mL A-C
SAMPLE ANALYSIS	oil & Grease - 9070	Gross Alpha, Gross Beta	Alcohols, Glycols, & Ketones - 8015	Alcohols, Glycols, & Ketones - 8015 (1-Butanol, Methanol)	See item (1) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time	oil & Grease	Gross Alpha/Beta	Alcohols 8015	Alcohols 8015 (1-Butanol, Methanol)	Item (1)
B110B1	WATER	12.4.00	0700				X	X
B110B2	WATER	12.4.00	0945	X			X	X
B110B3	WATER	12.4.00	1015	X			X	X
~~B11265~~	~~WATER~~	~~12.4.00~~	~~0945~~	RT 12.4.00				
~~B11266~~	~~WATER~~	~~12.4.00~~	~~1015~~					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg / R. Fahlberg	12.4.00 1130	RT / R Thorep	12.4.00 1130
RT / R Thorep	12.4.00 1300	Stored in RL 2B 3728 12.4.00	12.4.00 1300
Removed from RL 2B 3728	12.6.00 0900	RT / R Thorep	12.6.00 0900
RT / R. Thorep	12.5.00 0900	FED EX	
Fed Ex	12-6-00 0915	[signature]	12-6-00 0915
Fed Ex	12-7-00 0945	[signature]	12-7-00 0945

SPECIAL INSTRUCTIONS

(1) VOA - 8260A (App IX); VOA - 8260A (App IX Add-On) {1,1,2-Trichloro-1,2,2-trifluoroethane, 1,3-Butadiene, 1-Butanol, 2-Chloroethyl vinyl ether, Allyl alcohol, cis-1,2-Dichloroethylene, Crotonaldehyde, Dichloropropanol, Diethyl ether, Ethyl acetate, Isoprop

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12/4/00

Matrix *: S=Soil, SE=Sediment, SO=Solid, S=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquid, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B99-037-11	Page 1 of 3 ERT
Collector Fahlberg/Johansen	Company Contact F Roeck	Telephone No. 372-9086	Project Coordinator WEISS. RL	Price Code 7N Air Quality	Data Turnaround 45 Days
Project Designation ERDF Leachate Delisting Analysis	Sampling Location ERDF		SAF No. B99-037		
Ice Chest No. ERC 96-034, D39,042 (1 of 8, 2 of 3, 3 of 3)	Field Logbook No. EL 1517-1	COA RERDF22560	Method of Shipment Fed EX		
Shipped To TMA/RECRA RT 12.4.00	Offsite Property No. A010034		Bill of Lading/Air Bill No. 4235 7453 - 0967, 0978, 0989		

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Preservation	None	HCl to pH <2 Cool 4C	Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	Cool 4C	Cool 4C	H2SO4 to pH <2 Cool 4C	HNO3 to pH <2
Type of Container	P	aG	aG	aG	P	P	P	P	P	P
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	120mL	250mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL
SAMPLE ANALYSIS	pH (Water) - 9040	TOC - 9060	Carbonyls - 8315 (Formaldehyde)	Mercury - 7470 - (CV)	Conductivity - 9050	See item (1) in Special Instructions	TDS - 160.1	TSS - 160.2	Ammonia - 350.3	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time	
~~B110B1~~	WATER	12.4.00	0700 RT 12.4.00	
B110B2	WATER	12.4.00	0945	X X X X X X X X X X
B110B3	WATER	12.4.00	1015	X X X X X X X X X X
~~B11266~~	WATER	12.4.00	0945	RT 12.4.00
~~B11266~~	WATER	12.4.00	1015	

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg R Fahlberg	12.4.00 1130	R Thoren	12.4.00 1130
R Thoren	12.4.00 1300	Stored in R4 2B 3728	12.4.00 1300
Removed from R4 2B 3728	12.5.00 0400	R Thoren	12.6.00 0900
R Thoren	12.5.00 0900		
Fed Ex	12.6.00 0915	V Hendy	12.6.00 0915
Fed Ex	12.7.00 0945	V Hendy	12.7.00 0945

SPECIAL INSTRUCTIONS

(1) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate)
(2) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium, Silicon, Thallium, Tin)

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12/4/00

Matrix *

S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-037-11

Collector: Fahlberg/Johansen	Company Contact: F Roeck / Telephone No.: 372-9086	Project Coordinator: WEISS, RL	Price Code: 7N / Data Turnaround: 45 Days
Project Designation: ERDF Leachate Delisting Analysis	Sampling Location: ERDF	SAF No.: B99-037	Air Quality
Ice Chest No.: ERC96-034, 039, 042 (1 of 3, 2 of 3, 3 of 3)	Field Logbook No.: EL 1517-1 / COA: RERDF22560	Method of Shipment: Fed EX	
Shipped To: ~~TMA/RECRA~~ RF 12.4.00	Offsite Property No.: A010034	Bill of Lading/Air Bill No.: 42357453-0967, 0978, 0989	

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

SAMPLE ANALYSIS

Preservation	HNO3 to pH <2	ZnAc+NaOH to pH >9 Cool	HCl to pH <2	HNO3 to pH <2	NaOH to pH >= 12 Cool 4C	None	Cool 4C EF	Cool 4C IJ	Cool 4C GH	Cool 4C
Type of Container	P	P	P	P	P	P	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	2	2	2	2
Volume	500mL (Delete RT 12.4.00)	500mL	1000mL (Delete RT 12.4.00)	1000mL (Delete RT 12.4.00)	1000mL	1000mL (Delete RT 12.4.00)	1000mL	1000mL	1000mL	1000mL
Sample Analysis	~~Total Uranium~~	Sulfides - 9030	~~Technetium-99~~	~~See item (1) in Special Instructions~~	Total Cyanide - 9010	~~Carbon-14~~	See item (2) in Special Instructions	Chloro-Herbicides - EPA8151	Pest/PCBs - 8081	See item (3) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
~~B110B1~~	~~WATER~~	~~12.4.00~~	~~0700~~ RT 12.4.00										
B110B2	WATER	12.4.00	0945		X			X		X	X	X	X
B110B3	WATER	12.4.00	1015		X			X		X	X	X	X
~~B11266~~	~~WATER~~	~~12.4.00~~	~~0945~~										
~~B11266~~	~~WATER~~	~~12.4.00~~	~~1015~~ RT 12.4.00										

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R. Fell / RFahlberg	12.4.00 1130	R T / RThoren	12.4.00 1130
R T / RThoren	12.4.00 1300	Stored in E40 Bldg 2B 3728	12.4.00 1300
Removed from E40 Bldg 2B 3728	12.6.00 0900	R T / RThoren	12.5.00 0900
R T / RThoren	12.5.00 0900	FEDEX	
FedEx	12.6.00 0915	[signature]	12.6.00 0915
FedEx	12.7.00 0945	[signature]	12.7.00 0945

SPECIAL INSTRUCTIONS

~~(1) Gamma Spectroscopy (Water) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}~~ RT 12.4.00

(2) 8310_SVOA_HPLC {Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenz[a,h]anthracene}

(3) Semi-VOA - 8270A (App IX): Semi-VOA -- 8270A (App IX Add-On) {1,2-Diphenylhydrazine, 1,4-Dinitrobenzene, 1-Acetyl-2-thiourea, 2,5-Diaminotoluene, 2-Cyclohexyl-4,6-dinitrophenol}

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12/4/00

Matrix *

S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: ERDF			DATA PACKAGE: H1173		
VALIDATOR: TLI		LAB: RecRA		DATE: 3/1/01	
CASE:			SDG: H1173		
ANALYSES PERFORMED					
☐ CLP3/90	☐ SW-846 8080	☒ SW-846 8081	☐	☒ 8151	☐
SAMPLES/MATRIX B110B2 B110B3					
				water	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

3.1 INSTRUMENT PERFORMANCE (METHOD 8080 AND 8081)

Are DDT retention times acceptable . . . . . Yes No (N/A)

Are calibration standard retention times acceptable? . . . . . Yes No (N/A)

Are DDT and endrin breakdowns acceptable? . . . . . Yes No (N/A)

A82

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are DBC retention times acceptable? . . . . . Yes No (N/A)
Is the GC/MS tuning/performance check acceptable? . . . . . Yes No (N/A)
Comments:

3.2 CALIBRATIONS (METHOD 8080 AND 8081)

Are EVAL standard calibration factors and %RSD values acceptable? . . . . . Yes No (N/A)
Are quantitation column calibration factor %RSD values acceptable? . . . . . Yes No (N/A)
Were the analytical sequence requirements met? . . . . . Yes No (N/A)
Are continuing calibration %D values acceptable? . . . . . Yes No (N/A)
Comments:

3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

Was the initial calibration sequence performed? . . . . . Yes No (N/A)
Was the resolution acceptable in the resolution check mix? . . Yes No (N/A)
Is resolution acceptable in the PEM, INDA and INDB? . . . . . Yes No (N/A)
Are DDT and Endrin breakdowns acceptable? . . . . . Yes No (N/A)
Are retention times in PEMs and calibration mixes acceptable? . Yes No (N/A)
Are RPD values in the PEMs acceptable? . . . . . Yes No (N/A)
Are %RSD values acceptable? . . . . . Yes No (N/A)
Comments:

3.4 CALIBRATION VERIFICATION (3/90 SOW)

Were the analytical sequence requirements met? . . . . . Yes No (N/A)
Is resolution acceptable in the PEMs? . . . . . Yes No (N/A)
Are initial calibrations acceptable? . . . . . Yes No (N/A)

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMs, INDA and INDB mixes?	Yes	No	N/A
Are RPD values in the PEMs acceptable?	Yes	No	N/A
Are the DDT and endrin breakdowns acceptable?	Yes	No	N/A
Was GPC cleanup performed?	Yes	No	N/A
Is the GPC calibration check acceptable?	Yes	No	N/A
Was Florisil cleanup performed?	Yes	No	N/A
Is the Florisil performance check acceptable?	Yes	No	N/A

Comments:

4. BLANKS

Were laboratory blanks analyzed?	Yes	No	N/A
Are laboratory blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments: NO FB

5. ACCURACY

Were surrogates analyzed?	Yes	No	N/A
Are surrogate recoveries acceptable?	Yes	No	N/A
Were MS/MSD samples analyzed?	Yes	No	N/A
Are MS/MSD results acceptable?	Yes	No	N/A
Were LCS samples analyzed?	Yes	No	N/A
Are LCS results acceptable?	Yes	No	N/A

Comments: B11082 - not analyzed w/SDG J all

PESTICIDE/PCB DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . (Yes) No N/A

Are laboratory duplicate results acceptable? . . . . . Yes No (N/A)

Are field duplicate RPD values acceptable? . . . . . (Yes) No N/A

Are field split RPD values acceptable? . . . . . Yes No (N/A)

Comments:

7. SYSTEM PERFORMANCE

Is chromatographic performance acceptable? . . . . . Yes No (N/A)

Are positive results resolved acceptably? . . . . . Yes No (N/A)

Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No (N/A)

Is compound quantitation acceptable? . . . . . Yes No (N/A)

Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . (Yes) No N/A

Are all results supported in the raw data? . . . . . Yes (No) (N/A)

Do results meet the CRQLs? . . . . . Yes (No) N/A

Comments:

See narrative

Date: 15 March 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF Leachate Delisting Analysis
Subject: Volatiles - Data Package No. H1173-RLN (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-RLN prepared by Recra LabNet (RLN) or Lionville Laboratory Incorporated. A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analysis
B110B1	12/4/00	Water	C	See notes 1,2,& 3
B110B2	12/4/00	Water	C	See notes 1, 2 & 3
B110B3	12/4/00	Water	C	See notes 1, 2 & 3

1 - Volatiles by EPA 8260A
2 - Alcohols (butanol and methanol) by 8015B (8015M requested) and formaldehyde by 8315 (B110B2 and B110B3 only)
3 - Diethyl ether was requested by 8015M but not reported (reported by 8260A).

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. Preserved water samples must be analyzed within 14 days of the date of sample collection for VOA and alcohols.

Samples must be derivitized within 3 days and analyzed within 3 days for formaldehyde. If holding times are exceeded, but not by greater than twice the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than twice the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the project quantitation limit (PQL) and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the PQL, qualified as undetected and flagged "U".

Due to laboratory blank contamination, all formaldehyde results were raised to the PQL qualified as undetected and flagged "U".

Due to laboratory blank contamination, all methylene chloride results were qualified as undetected and flagged "U".

Due to laboratory blank contamination, all acetone results were raised to the PQL qualified as undetected and flagged "U".

All other method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

  Matrix Spike/Matrix Spike Duplicate Recoveries

  Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within established laboratory quality control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

  All matrix spike/matrix spike duplicate recovery results were acceptable.

  Surrogate Recovery

  The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification. Surrogates are not required for formaldehyde analysis.

  All surrogate recovery results were acceptable.

- **Precision**

  Matrix Spike/Matrix Spike Duplicate Samples

  Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For samples analyzed using SW-846 protocol, results must be within RPD limits of +/- 20% for water

samples and +/- 35% for solid samples. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. Thirty-five analytes had reported analytical detection levels above the analyte specific PQL (see pages 11 and 12). Under the BHI validation SOW, no qualification is required.

- **Completeness**

Data package No. H1173-RLN (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to laboratory blank contamination, all methylene chloride results were qualified as undetected and flagged "U". Due to laboratory blank contamination, all acetone results were raised to the PQL qualified as undetected and flagged "U". Due to

laboratory blank contamination, all formaldehyde results were raised to the PQL qualified as undetected and flagged "U".
Thirty-five analytes had reported analytical detection levels above the analyte specific PQL/CRDL (see pages 11 and 12). Under the BHI validation SOW, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE *Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary*, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validator in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Methylene chloride Acetone Formaldehyde	U	All	Blank contamination

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

VOLATILE ORGANIC , ALCOHOL AND FORMALDEHYDE ANALYSIS, WATER MATRIX, (UG/L)

Project: BECHTEL-HANFORD																	
Laboratory: RECRA LabNet																	
Case:	SDG: H1173																
Sample Number		B110B1		B110B2		B110B3											
Remarks						Duplicate											
Sample Date		12/04/00		12/04/00		12/04/00											
Analysis Date		12/15/00		12/15/00		12/15/00											
VOA/Alcohols/Formaldehyde	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane*	2.3	10	U	10	U	10	U										
Bromomethane*	1.4	10	U	10	U	10	U										
Vinyl Chloride*	3.4	10	U	10	U	10	U										
Chloroethane*	1	10	U	10	U	10	U										
Methylene Chloride	3.8	7	U	10	U	7	U										
Acetone	9.7	9.7	U	9.7	U	9.7	U										
Carbon Disulfide*	0.74	5	U	5	U	5	U										
1,1-Dichloroethene*	0.97	5	U	5	U	5	U										
1,1-Dichloroethane*	1	5	U	5	U	5	U										
trans-1,2-Dichloroethene	5	5	U	5	U	5	U										
cis-1,2-Dichloroethene*	0.51	5	U	5	U	5	U										
Chloroform*	0.86	5	U	5	U	5	U										
1,2-Dichloroethane*	0.72	5	U	5	U	5	U										
2-Butanone*	2.1	10	U	10	U	10	U										
1,1,1-Trichloroethane*	0.89	5	U	5	U	5	U										
Carbon Tetrachloride*	0.71	5	U	5	U	5	U										
Vinyl Acetate*	3.6	10	U	10	U	10	U										
Bromodichloromethane*	0.5	5	U	5	U	5	U										
1,2-Dichloropropane*	1	5	U	5	U	5	U										
cis-1,3-Dichloropropene*	0.51	5	U	5	U	5	U										
Trichloroethene	10	5	U	5	U	5	U										
Dibromochloromethane*	0.33	5	U	5	U	5	U										
1,1,2-Trichloroethane*	0.5	5	U	5	U	5	U										
Benzene*	0.84	5	U	5	U	5	U										
trans-1,3-Dichloropropene*	0.29	5	U	5	U	5	U										
Bromoform*	0.36	5	U	5	U	5	U										
4-Methyl-2-pentanone*	1	10	U	10	U	10	U										
2-Hexanone	10	10	U	10	U	10	U										
Tetrachloroethene	10	5	U	5	U	5	U										
1,1,2,2-Tetrachloroethane*	1.5	5	U	5	U	5	U										
Toluene*	0.79	5	U	5	U	5	U										
Chlorobenzene*	0.75	5	U	5	U	5	U										
Ethylbenzene*	1.3	5	U	5	U	5	U										
Styrene*	0.64	5	U	5	U	5	U										
Xylenes (total)*	0.71	5	U	5	U	5	U										
Acrolein	21.4	20	U	20	U	20	U										
Acrylonitrile*	1.7	5	U	5	U	5	U										

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize mis-interpretation of results. All other qualifiers shown were applied during validation.

Project: BECHTEL-HANFORD																	
Laboratory: RECRA LabNet																	
Case:	SDG: H1173																
Sample Number		B110B1		B110B2		B110B3											
Remarks						Duplicate											
Sample Date		12/04/00		12/04/00		12/04/00											
Analysis Date		12/15/00		12/15/00		12/15/00											
VOA/Alcohols/Formaldehyde	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Trichlorofluoromethane	2	5	U	5	U	5	U										
Dichlorodifluoromethane*	2.3	10	U	10	U	10	U										
Acetonitrile	23.5	20	U	20	U	20	U										
Idomethane		5	U	5	U	5	U										
Propionitrile (ethyl cyanide)		50	U	50	U	50	U										
3-Chloropropene*	1.2	10	U	10	U	10	U										
Methacrylonitrile*	2.2	10	U	10	U	10	U										
Dibromomethane		10	U	10	U	10	U										
Isobutyl Alcohol	380	100	U	100	U	100	U										
1,2-Dibromoethane		10	U	10	U	10	U										
1,1,1,2-Tetrachloroethane		5	U	5	U	5	U										
1,2,3-Trichloropropane		10	U	10	U	10	U										
trans-1,4-Dichloro-2-butene		20	U	20	U	20	U										
1,2-Dibromo-3-chloropropane		10	U	10	U	10	U										
2-Chloro-1,3-butadiene		5	U	5	U	5	U										
2-Chloroethylvinylether*	3.1	10	U	10	U	10	U										
1,1,2-Trichlorotrifluoroethane		10	U	10	U	10	U										
Ethyl Acetate	10	10	U	10	U	10	U										
Diethyl Ether		10	U	10	U	10	U										
n-Butanol*	12.6	250	U	250	U	250	U										
Alcohols by 8015B																	
Butanol**		5.0	U	5.0	U	5.0	U										
Methanol**	5	5.0	U	5.0	U	5.0	U										
Formaldehyde by 8315																	
Formaldehyde	5000	Not analyzed		5000	U	5000	U										
* - Reported detection limit exeeds PQL																	
** - MG/L																	
NA = Not Analyzed																	

210012

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize mis-interpretation of results. All other qualifiers shown were applied during validation.

Sample Information	Cust ID:	B110B1	B110B1	B110B1	B110B2	B110B3	VBLKII
	RFW#:	001	001 MS	001 MSD	002	003	00LVN416-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Surrogate Recovery	1,2-Dichloroethane-d4	109 %	103 %	108 %	116 * %	110 %	113 %
	Toluene-d8	95 %	96 %	97 %	108 %	98 %	102 %
	Bromofluorobenzene	89 %	86 %	88 %	98 %	89 %	92 %
Chloromethane		10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane		10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride		10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane		10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride		7 B U	13 B	12 B	10 B U	7 B U	8
Acetone		9.7 JB U	3 JB	2 JB	9.7 JB U	4.7 JB U	3 J
Carbon Disulfide		5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene		5 U	79 %	81 %	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene		5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene		5 U	5 U	5 U	5 U	5 U	5 U
Chloroform		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone		10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride		5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate		10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane		5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene		5 U	92 %	99 %	5 U	5 U	5 U
Dibromochloromethane		5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
Benzene		5 U	92 %	97 %	5 U	5 U	5 U
Trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U
Bromoform		5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone		10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone		10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene		5 U	5 U	5 U	5 U	5 U	5 U

*= Outside of EPA CLP QC limits.

3/13/01

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1b

Cust ID:	B110B1	B110B1	B110B1	B110B2	B110B3	VBLKII
RFW#:	001	001 MS	001 MSD	002	003	00LVN416-MB1
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	99 %	102 %	5 U	5 U	5 U
Chlorobenzene	5 U	99 %	103 %	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5 U	5 U	5 U	5 U	5 U	5 U
Acrolein	20 U	20 U	20 U	20 U	20 U	20 U
Acrylonitrile	5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5 U	5 U	5 U	2 J	1 J	5 U
Dichlorodifluoromethane	10 U	10 U	10 U	10 U	10 U	10 U
Acetonitrile	20 U	20 U	20 U	20 U	20 U	20 U
Iodomethane	5 U	5 U	5 U	5 U	5 U	5 U
Propionitrile (Ethyl Cyanide)	50 U	50 U	50 U	50 U	50 U	50 U
3-Chloropropene	10 U	10 U	10 U	10 U	10 U	10 U
Methacrylonitrile	10 U	10 U	10 U	10 U	10 U	10 U
Dibromomethane	10 U	10 U	10 U	10 U	10 U	10 U
Isobutyl alcohol	100 U	100 U	100 U	100 U	100 U	100 U
1,2-Dibromoethane	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,4-Dichloro-2-butene	20 U	20 U	20 U	20 U	20 U	20 U
1,2-Dibromo-3-chloropropane	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloro-1,3-Butadiene	5 U	5 U	5 U	5 U	5 U	5 U
2-Chloroethylvinylether	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichlorotrifluoroethane	10 U	10 U	10 U	10 U	10 U	10 U
Ethyl acetate	10 U	10 U	10 U	10 U	10 U	10 U
Diethylether	10 U	10 U	10 U	10 U	10 U	10 U
N-Butanol	250 U	250 U	250 U	250 U	250 U	250 U

*= Outside of EPA CLP QC limits.

0000074

3/13/01

Cust ID: **VBLKII BS**

Sample Information
RFW#: **00LVN416-MB1**
Matrix: WATER
D.F.: 1.00
Units: UG/L

Surrogate Recovery	1,2-Dichloroethane-d4	108	%
	Toluene-d8	93	%
	Bromofluorobenzene	86	%

Chloromethane	10	U
Bromomethane	10	U
Vinyl Chloride	10	U
Chloroethane	10	U
Methylene Chloride	11	B
Acetone	3	JB
Carbon Disulfide	5	U
1,1-Dichloroethene	79	%
1,1-Dichloroethane	5	U
trans-1,2-Dichloroethene	5	U
cis-1,2-Dichloroethene	5	U
Chloroform	5	U
1,2-Dichloroethane	5	U
2-Butanone	10	U
1,1,1-Trichloroethane	5	U
Carbon Tetrachloride	5	U
Vinyl Acetate	10	U
Bromodichloromethane	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
Trichloroethene	97	%
Dibromochloromethane	5	U
1,1,2-Trichloroethane	5	U
Benzene	98	%
Trans-1,3-Dichloropropene	5	U
Bromoform	5	U
4-Methyl-2-pentanone	10	U
2-Hexanone	10	U
Tetrachloroethene	5	U

*= Outside of EPA CLP QC limits.

10/31/01

1,1,2,2-Tetrachloroethane	5	U	
Toluene	102	%	
Chlorobenzene	104	%	
Ethylbenzene	5	U	
Styrene	5	U	
Xylene (total)	5	U	
Acrolein	20	U	
Acrylonitrile	5	U	
Trichlorofluoromethane	5	U	
Dichlorodifluoromethane	10	U	
Acetonitrile	20	U	
Iodomethane	5	U	
Propionitrile (Ethyl Cyanide)	50	U	
3-Chloropropene	10	U	
Methacrylonitrile	10	U	
Dibromomethane	10	U	
Isobutyl alcohol	100	U	
1,2-Dibromoethane	10	U	
1,1,1,2-Tetrachloroethane	5	U	
1,2,3-Trichloropropane	10	U	
trans-1,4-Dichloro-2-butene	20	U	
1,2-Dibromo-3-chloropropane	10	U	
2-Chloro-1,3-Butadiene	5	U	
2-Chloroethylvinylether	10	U	
1,1,2-Trichlorotrifluoroethane	10	U	
Ethyl acetate	10	U	
Diethylether	10	U	
N-Butanol	250	U	

*= Outside of EPA CLP QC limits.

5/13/01

Recra LabNet - Lionville Laboratory

HPLC scan

Report Date: 12/13/00 09:50

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985-001-001-9999-00 Page: 1

	Cust ID:	B110B2	B110B2	B110B2	B110B3	BLK	BLK BS
Sample Information	RFW#:	002	002 MS	002 MSD	003	00LLC209-MB1	00LLC209-MB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Formaldehyde		5000 ~~22~~ ~~B~~ U	110 %	123 %	5000 ~~25~~ ~~B~~ U	17	183 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of Advisory limits.

3/13/01

Recra LabNet - Lionville Laboratory

GC SCAN

Report Date: 12/20/00 09:23

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985-001-001-9999-00 Page:

	Cust ID:	B110B1		B110B1		B110B1		B110B2		B110B3		BLK	
Sample Information	RFW#:	001		001 MS		001 MSD		002		003		00LLC210-MB1	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
			fl		fl		fl		fl		fl		fl
Methanol		5.0	U	96	%	102	%	5.0	U	5.0	U	5.0	U
Butanol		5.0	U	95	%	101	%	5.0	U	5.0	U	5.0	U

	Cust ID:	BLK BS	
Sample Information	RFW#:	00LLC210-MB1	
	Matrix:	WATER	
	D.F.:	1.00	
	Units:	mg/L	
			fl
Methanol		100	%
Butanol		101	%

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of Advisory limits.

3/13/01

12.28.00

000028

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU HANFORD B00-037
RFW #: 0012L502
SDG/SAF#: H1173/B00-037

W.O. #: #: 10985-001-001-9999-00
Date Received: 12-07-00

GC SCAN

The set of samples consisted of three (3) water samples collected on 12-04-00.

The samples and their associated QC samples were prepared and analyzed by methodology based on EPA Method 8015B for Methanol and Butanol on 12-11-00.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.

2. All required holding times were met for these samples.

3. All initial calibrations associated with this data set were within acceptance criteria.

4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.

5. Recra does not use surrogate spikes for this analysis. The method does not provide specific guidance regarding the use of surrogates and performance criteria. Method performance is monitored through the use of blank spikes and matrix spikes.

6. All blank spike recoveries were within advisory control limits of 50%-150%.

7. All matrix spike recoveries were within the advisory control limits of 50%-150%.

8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. The laboratory Manager or a designee, as verified by the following signature, has authorized release of the data contained in this hard-copy data package.

By _____
J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

01-02-01
Date

r:\group\hplc-gcsc\narr\gcvoa-scan\2000\12-502al..doc

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B99-037
RFW #: 0012L502
SDG/SAF#: H1173/B99-037

W.O. #: #: 10985-001-001-9999-00
Date Received: 12-07-00

LC SCAN

The set of samples consisted of two (2) water samples collected on 12-04-00.

The samples and their associated QC samples were prepared on 12-07-00 and analyzed using Recra OP's based on EPA Method 8315 for formaldehyde on 12-09-00.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1 All initial calibrations associated with this data set were within acceptance criteria.

2. All continuing calibration standards analyzed prior to the sample extracts met acceptance criteria.

3. Recra does not use surrogate spikes for this analysis. The method does not provide specific guidance regarding the use of surrogates and performance criteria.

4. The blank spike recovery was outside the laboratory advisory control limits of 50%-150%.

5. The matrix spike recoveries were within the advisory control limits of 50%-150%.

6. The blank contained Formaldehyde above the reporting limit. The sample results have been flagged with a B. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

7. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

12-20-00
Date

r:\group\hpls-gcscan\narr\aldehydes\12-502tmu..doc

LIONVILLE LABORATORY INC.

Client: TNU-HANFORD B99-037
RFW #: 0012L502
SDG/SAF #: H1173/B99-037

W.O. #: 10985-001-001-9999-00
Date Received: 12-07-2000

GC/MS VOLATILE

Three (3) water samples were collected on 12-04-2000.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville laboratory OPs based on SW 846 Method 8260A for client specified Volatile target compounds on 12-15-2000.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. All samples were analyzed within required holding time.
3. Non-target compounds were not detected in the samples.
4. One (1) of twenty-one (21) surrogate recoveries was outside EPA QC limits. The surrogate recovery of 1,2-Dichloroethane-d4 was biased slightly high in sample B110B2; however, there was no significant target compounds detected in the samples. The sample was not reanalyzed because of the holding time constraint. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blank contained the common laboratory contaminants Methylene Chloride and Acetone at levels less than 2x the CRQL.
8. Internal standard area and retention time criteria were met.
9. A spectral search was performed for compounds 1,3-Butadiene, Allyl Alcohol, Crotenaldehyde, Dichloropropanol, Isopropyl Benzene, 2,3-Dichloro-1-Propanol, Tetrahydrofuran and 1,3-Dichloro-2-Propanol; however, these compounds were not identified in the samples.
10. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."
11. As of January 27, 2001, Recra LabNet Philadelphia became Lionville Laboratory Incorporated. Some Forms may still reference Recra LabNet Philadelphia.

J. Michael Taylor
President
Lionville laboratory Incorporated

02-12-01
Date

soon\group\data\vos\tnu-hanford-12-502.doc

02

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

RECRA

Sample Discrepancy Report (SDR)

SDR #: 01VT020

Initiator: Deb Kastvas
Date: 1/11/01
Client: TNU Hanford
Batch: 0012502
Samples: -002
Method: SW846/MGAWW/CLP/
Parameter: 0624N
Matrix: water
Prep Batch: 00LVN416

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Transcription Error __ Client Request __ Wrong Test Code __ Sampler Error on C-O-C __ Other ________

b. General Discrepancy
__ Missing Sample/Extract
__ Hold Time Exceeded
__ Improper Bottle Type
__ Container Broken
__ Insufficient Sample
__ Not Amenable to Analysis
__ Wrong Sample Pulled
__ Preservation Wrong
__ Label ID's Illegible
__ Received Past Hold

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: ________

c. QC Problem (include all relevant specific results; attach data if necessary)
Sample had one Surrogate high & wasn't rerun. Past hold (Dec. 18th, 2000). Please advise

2. Known or Probable Causes(s) (To be used for trend analysis)
__ Lack of Organization
__ Lack of Training
__ Lack of Discipline
__ Lack of Resources
__ Lack of Time
__ Lack of Management Support
__ Other (Please explain):

3. Discussion and Proposed Action
__ Re-log
__ Entire Batch
__ Following Samples: ________
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to ________
__ Place On/Take Off Hold (circle)

Other Description:

4. Project Manager Instructions...signature/date: [signature] 1/11/01
__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
✓ Include in Case Narrative
__ Client Contacted:
Date/Person ________
__ Add
__ Cancel

5. Final Action...signature/date: Beth Robbins 1/16/01
Other Explanation:
__ Verified re-[log][leach][extract][digest][analysis] (circle)
X Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA for distribution and filing.

Route/Distribution of SDR
__ Initiator
__ Lab Manager: M. Taylor
(1) Project Mgr: Stone/Carey/Johnson
__ Section Mgr: Wesson/Daniels
X QA (file): Schrenkel
__ Data Management: Feldman
__ Sample Prep: Bickel/Kauffman

Route — Distribution of Completed SDR
__ Metals: Doughty
__ Inorganic: Perrone
__ GC/LC: Pastor
__ MS: Layman/Rycklak
__ Log-in: Keppel
__ Admin: Soos
__ Other: ________

5

LWL006F-08/00

W14 71J

Bechtel Hanford Inc. — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-037-11 | Page 3 of 6

Collector: Fahlberg/Johansen	Company Contact: F Roeck	Telephone No.: 372-9086	Project Coordinator: WEISS. RL
Project Designation: ERDF Leachate Delisting Analysis	Sampling Location: ERDF		SAF No.: B99-037
Ice Chest No.: ERCA16-034,039,042	Field Logbook No.: EL 1517-1	COA: RERDF22560	Method of Shipment: Fed EX
Shipped To: TMA/RECRA	Offsite Property No.: A010034		Bill of Lading/Air Bill No.: 42357453-0967,0978,0989

Price Code: 7N — Air Quality — Data Turnaround: 45 Days

RT 12.4.00

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

Preservation	HCL to pH <2 Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	HCl Cool 4C					
Type of Container	aG		aGs*	aGs*	aGs*					
No. of Container(s)	2		3	3	3					
Volume	1000mL	1000mL	40mL	40mL	40mL A-C					
SAMPLE ANALYSIS	oil & Grease - 9070	Gross Alpha, Gross Beta	Alcohols, Glycols, & Ketones - 8015	Alcohols, Glycols, & Ketones - 8015 (1-Butanol, Methanol)	See item (1) in Special Instructions.					

RT 12.4.00

Sample No.	Matrix *	Sample Date	Sample Time									
3110B1	WATER	12·4·00	0700				X	X				
3110B2	WATER	12·4·00	0945	X			X	X				
3110B3	WATER	12·4·00	1015	X			X	X				
311265	WATER	12·4·00	0945	RT 12.4.00								
311266	WATER	12·4·00	1015									

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
R. Fahlberg / R.Fahlberg	12.4.00 1130	R.T. Thorer	12.4.00 1130
R.T. Thorer	12.4.00 1300	Stored in R4 2B 3728	12.4.00 1300
Removed from R4 2B 3728	12.6.00 0900	R.T. Thorer	12.6.00 0900
R.T. Thorer	12.5.00 0900	FED EX	
Fed Ex	12.7.00 0915		12-6-00 0915
Fed Ex	12.7.00 0945		12-7-00 0945

Sign/Print Names

SPECIAL INSTRUCTIONS

(1) VOA - 8260A (App IX); VOA - 8260A (App IX Add-On) [1,1,2-Trichloro-1,2,2-trifluoroethane, 1,3-Butadiene, 1-Butanol, 2-Chloroethyl vinyl ether, Allyl alcohol, cis-1,2-Dichloroethylene, Crotonaldehyde, Dichloropropanol, Diethyl ether, Ethyl acetate, Isoprop

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12/4/00

Matrix *: S=Soil; SE=Sediment; SO=Solid; S=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WI=Wipe; L=Liquid; V=Vegetation; X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

HI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-037-11	Page 1 of ~~1~~ RT 2.58

...ctor ...hlberg/Johansen	Company Contact F Roeck — Telephone No. 372-9086	Project Coordinator WEISS, RL	Price Code 7N — Data Turnaround 45 Days
...ect Designation ...DF Leachate Delisting Analysis	Sampling Location ERDF	SAF No. B99-037	Air Quality
...hest No. ...L96-034, 039, 042 (1 of 3, 2 of 3, 3 of 3)	Field Logbook No. EL 1517-1 — COA RERDF22560	Method of Shipment Fed EX	
...ped To ...MA/RECRA RT 12·4·00	Offsite Property No. A010034	Bill of Lading/Air Bill No. 4235 7453 - 0967, 0978, 0989	

...SSIBLE SAMPLE HAZARDS/REMARKS
NONE

...ecial Handling and/or Storage

Preservation	None	HCl to pH <2 Cool 4C	Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	Cool 4C	Cool 4C	H2SO4 to pH <2 Cool 4C	HNO3 to pH <2
Type of Container	P	aG	aG	aG	P	P	P	P	P	P
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	120mL	250mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL
SAMPLE ANALYSIS	pH (Water) - 9040	TOC - 9060	Carbonyls - 8315 (Formaldehyde)	Mercury - 7470 - (CV)	Conductivity - 9050	See item (1) in Special Instructions	TDS - 160.1	TSS - 160.2	Ammonia - 350.3	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
~~...10B1~~	~~WATER~~	~~12·4·00~~	~~0700~~ RT 12·4·00										
...10B2	WATER	12·4·00	0945	X	X	X	X	X	X	X	X	X	X
...10B3	WATER	12·4·00	1015	X	X	X	X	X	X	X	X	X	X
~~...1265~~	~~WATER~~	~~12·4·00~~	~~0945~~	RT 12·4·00									
~~...1266~~	~~WATER~~	~~12·4·00~~	~~1015~~										

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
F... / RFahlberg	1130 12·4·00	RT / RThoren	1130 12·4·00
RT / RThoren	1300 12·4·00	Stored in ...RL 2B 3728	1300 12·4·00
Removed from ...RL 2B 3728	0900 12·5·00	RT / RThoren	0900 12·6·00
RT / RThoren	0900 12·5·00	FED EX	
Fed Ex	12·6·00 0915	[signature]	12·6·00 0915
Fed Ex	12·7·00 0945	V. Hand...	12·7·00 0945

SPECIAL INSTRUCTIONS

(1) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate)
(2) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium, Silicon, Thallium, Tin)

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.
RT 12/4/00

Matrix *
S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

...BORATORY SECTION	Received By	Title		Date/Time
...IAL SAMPLE ...ISPOSITION	Disposal Method	Disposed By		Date/Time

...EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: ERDF			DATA PACKAGE: H1173		
VALIDATOR: TLI		LAB: LUI		DATE: 3/5/01	
CASE:			SDG: H1173		

ANALYSES PERFORMED

☐ CLP Volatiles	☐ SW-846 8240 (cap column)	☒ SW-846 8260 (packed column)	☐ CLP Semivolatiles	☐ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☒ 8015B	☒ 8315	☐	☐	☐

SAMPLES/MATRIX B110B1 B110B2 B110B3

water

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A
Are continuing calibrations acceptable? . . . . . Yes No N/A

Comments: _____

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A
Are laboratory blank results acceptable? . . . . . Yes No N/A
Were field/trip blanks analyzed? . . . . . Yes No N/A
Are field/trip blank results acceptable? . . . . . Yes No N/A

Comments: Methylene Chloride U
acetone 3.8 + U
NOFB
Form O at 500v

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed? . . . . . Yes No N/A
Are surrogate/System Monitoring Compound recoveries acceptable? Yes No N/A
Were MS/MSD samples analyzed? . . . . . Yes No N/A
Are MS/MSD results acceptable? . . . . . Yes No N/A

Comments: Surrogate - 116% all U - OK

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . Yes No N/A

Are field duplicate RPD values acceptable? . . . . . Yes No N/A

Are field split RPD values acceptable? . . . . . Yes No N/A

Comments:_____

7. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No N/A

Are internal standard areas acceptable? . . . . . Yes No N/A

Are internal standard retention times acceptable? . . . . . Yes No N/A

Comments:_____

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A

Is compound quantitation acceptable? . . . . . Yes No N/A

Comments:_____

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A

Are all results supported in the raw data? . . . . . Yes No N/A

Do results meet the CRQLs? . . . . . Yes No N/A

Has the laboratory properly identified and coded all TIC? . . . Yes No N/A

Comments:_____

Date: 15 March 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: ERDF Leachate Delisting Analysis
Subject: Wet Chemistry - Data Package No. H1173-RLN (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/4/00	Water	C	See note 1
B110B3	12/4/00	Water	C	See note 1

1 - IC Anions - 9056 (bromide, chloride, fluoride, nitrate, nitrite, phosphate, sulfate); ammonia - 350.3; cyanide - 9010B; total organic carbon (TOC) - 9060; total dissolved solids (TDS) - 160.1; total suspended solids (TSS) - 160.2; specific conductance - 9050A, pH - 9040A; sulfide - 9030A; oil & grease - 9070.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 28 days for ammonia, specific conductance, TOC and oil &

grease; 14 days for cyanide; 7 days for sulfide, TSS and TDS; 2 days for IC anions; and immediate for pH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by less than twice the limit, all IC anions were qualified as estimates and flagged "J".

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J".

It should be noted that when the cyanide sample were received at the laboratory the pH indicated that the samples were either not preserved correctly or the sample matrix buffered the preservative. No qualifiers were assigned.

Holding times were met for all other parameters and samples.

- **Method Blanks**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample

concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of less than 30% and a sample value below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

All matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 20% for water samples. If RPD values are out of specification and the sample concentration is greater than five times the project quantitation limit (PQL) or CRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the PQL/CRQL and the sample concentration is less than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the PQL/CRQL or plus or minus the PQL/CRQL for positive sample results less than five times the PQL/CRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to an RPD of 23.1%, all total dissolved solids results were qualified as estimates and flagged "J".

All other laboratory duplicate results were within the required control limits.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to Recra for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for total organic carbon (30%) and total dissolved solids (29%) were outside QC limits. Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Analytical Detection Levels**

  Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. The following reported detection limits were above the PQL: Cyanide, phosphate, nitrite, fluoride, bromide, ammonia and total suspended solids. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package No. H1173-RLN (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the holding time being exceeded by less than twice the limit, all detected IC anions were qualified as estimates and flagged "J". Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J". Due to an RPD of 23.1%, all total dissolved solids results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following reported detection limits were above the PQL: Cyanide, phosphate, nitrite, fluoride, bromide, ammonia and total suspended solids. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WHC procedures are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
pH IC anions	J	All	Holding times
Total dissolved solids	J	All	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

GENERAL CHEMISTRY ANALYSIS, WATER MATRIX, (MG/L)

Project: BECHTEL-HANFORD																											
Laboratory: Recra LabNet																											
Case	SDG: H1173																										
Sample Number		B110B2		B110B3																							
Remarks				Duplicate																							
Sample Date		12/04/00		12/04/00																							
General Chemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Bromide	0.25	12.5	UJ	12.5	UJ																						
Chloride		303	J	296	J																						
Fluoride	0.05	5.0	UJ	5.0	UJ																						
Nitrite	0.05	12	UJ	12	UJ																						
Nitrate	0.05	260	J	290	J																						
Cyanide***	3.1	5.0	U	5.0	U																						
Phosphate	0.25	0.50	UJ	0.50	UJ																						
Sulfate	0.25	369	J	384	J																						
Ammonia	0.03	0.10	U	0.10	U																						
TOC	0.53	10.8		8.0																							
Oil & Grease	0.5	4.8		4.7																							
pH*	0.1	7.8		7.8																							
Sulfide		1.0		1.0	U																						
Specific Conductance**	0.15	2360		2430																							
TDS	4.7	1500	J	2000	J																						
TSS	1	5.0	U	5.0	U																						

000010

* Units are pH units

** Units are UMHOS/CM

*** Units are ug/l

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 01/23/01

CLIENT: TNUHANFORD B99-037 H1173 RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	B110B2	Bromide by IC	12.5	uJ	MG/L	12.5	50.0
		Chloride by IC	303	J	MG/L	12.5	50.0
		Fluoride by IC	5.0	uJ	MG/L	5.0	10.0
		Nitrite by IC	12	uJ	MG/L	12	50
		Nitrate by IC	260	J	MG/L	12	50
		Cyanide, Total	5.0	u	UG/L	5.0	1.0
		Phosphate by IC	0.50	uJ	MG/L	0.50	2.0
		Sulfate by IC	369	J	MG/L	12.5	50.0
		Ammonia, as N	0.10	u	MG/L	0.10	1.0
		Total Organic Carbon	10.8		MG/L	0.50	1.0
		Oil & Grease Gravimetri	4.8		MG/L	1.1	1.0
		pH	7.8	J	PH UNIT	0.01	1.0
		Sulfide	1.0		MG/L	1.0	1.0
		Specific Conductance	2360		UMHOS/C	1.0	1.0
		Total Dissolved Solids	1500	J	MG/L	5.0	1.0
		Total Suspended Solids	5.0	u	MG/L	5.0	1.0
-003	B110B3	Bromide by IC	12.5	uJ	MG/L	12.5	50.0
		Chloride by IC	296	J	MG/L	12.5	50.0
		Fluoride by IC	5.0	uJ	MG/L	5.0	10.0
		Nitrite by IC	12	uJ	MG/L	12	50
		Nitrate by IC	290	J	MG/L	12	50
		Cyanide, Total	5.0	u	UG/L	5.0	1.0
		Phosphate by IC	0.50	uJ	MG/L	0.50	2.0
		Sulfate by IC	384	J	MG/L	12.5	50.0
		Ammonia, as N	0.10	u	MG/L	0.10	1.0
		Total Organic Carbon	8.0		MG/L	0.50	1.0
		Oil & Grease Gravimetri	4.7		MG/L	1.1	1.0
		pH	7.8	J	PH UNIT	0.01	1.0
		Sulfide	1.0	u	MG/L	1.0	1.0
		Specific Conductance	2430		UMHOS/C	1.0	1.0
		Total Dissolved Solids	2000	J	MG/L	5.0	1.0
		Total Suspended Solids	5.0	u	MG/L	5.0	1.0

3/12/01

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-037 H1173
RFW# : 0012L502

W.O. # : 10985-001-001-9999-00
Date Received: 12-07-00

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 2 water samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.

3. Sample holding times as required by the method and/or contract were met with the exception of Nitrate, Nitrite, Phosphate and pH which were received past hold and replicate and spike analyses for Ammonia sample B110B3.

4. The cooler temperatures were recorded on the chain-of-custody.

5. The method blanks were within method criteria with the exception of 00LSS190-MB1 for Total Dissolved Solids (TDS) which was above the reporting limit and 00LSS191-MB1 for Total Suspended Solids (TSS) which was at the reporting limit. Results for TDS were greater than 10 times the reporting limit and TSS results were less than the reporting limit.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS were within the 20% Relative Percent Difference (RPD) control limit.

7. The matrix spike recoveries were within the 75-125% control limits.

8. The replicate analyses were within the 20% RPD control limit with the exception of TDS.

9. For Total Cyanide analysis, the sample was found to be neutral, though the bottle indicated sodium hydroxide (NaOH) preservative which would have fixed it to pH >12. The sample matrix may have buffered the NaOH preservative.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

01-24-01
Date

J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

njp&pefi\12-502

(610) 280-3000 • Fax (610) 280-3041

Recra LabNet Philadelphia **Sample Discrepancy Report (SDR)** SDR #: 00WC07269 JH 12-26-00

Initiator: JHoffman Batch: 00122502 Parameter: Wetchem
Date: 12-26-00 Samples: 002-003 Matrix: CN
Client: TNU Method: SW846/MCAWW/CLP/ Prep Batch: ____________

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C
__ Transcription Error __ Wrong Test Code __ Other ____________

b. General Discrepancy

__ Missing Sample/Extract __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample ✓ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note: Verified by [Log-In] or [Prep Group] (circle)...signature/date: ____________

c. QC Problem (include all relevant specific results; attach data if necessary)

Neutral

2. Known or Probable Causes(s)

Sample bottles (12-27-00) indicated NaOH preserved.
Sample matrix may have buffered preservative.

3. Discussion and Proposed Action Other Description: Propose to narrate. 12-27-00

__ Re-log
__ Entire Batch
__ Following Samples: ____________
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to ____________
__ Place On/Take Off Hold (circle)

4. Project Manager Instructions... signature/date: 12/28/00

__ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person ____________
__ Add
__ Cancel

5. Final Action... signature/date: Perrone 1-23-01 Other Explanation:

__ Verified re-[log][leach][extract][digest][analysis] (circle)
X Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
X	X Initiator: JHoffman		__ Metals: Doughty
	X Lab Manager: M. Taylor	(1)	__ Inorganic: Perrone
(2)	X Project Mgr: Stone/Carey/Schrenkel/Johnson (3)		__ GC/LC: Pastor
	X Section Mgr: Wesson/Daniels		__ MS: Durke/Rycklak
	X QA (file): Racioppi		__ Log-in: Keppel
	__ Data Management: Feldman		__ Admin: Soos
	__ Sample Prep: Doughty/Kauffman		__ Other: ____________

L-WI-006/E-02/00

65

WIDL 413

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-037-11 | Page 3 of 6

Collector: Fahlberg/Johansen
Company Contact: F Roeck | Telephone No.: 372-9086
Project Coordinator: WEISS, RL
Price Code: 7N | Data Turnaround: 45 Days
Project Designation: ERDF Leachate Delisting Analysis
Sampling Location: ERDF
SAF No.: B99-037
Air Quality
Shipping Chest No.: RCRA-034,039,042
Field Logbook No.: EL 1517-1
COA: RERDF22560
Method of Shipment: Fed EX
Shipped To: TMA/RECRA
Offsite Property No.: A010034
Bill of Lading/Air Bill No.: 42367453-0967,0978,0989

POSSIBLE SAMPLE HAZARDS/REMARKS: None

Special Handling and/or Storage

Preservation	HCL to pH <2 Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	HCl Cool 4C					
Type of Container	aG		aGs*	aGs*	aGs*					
No. of Container(s)	2		3	3	3					
Volume	1000mL	1000mL	40mL	40mL	40mL A-C					
SAMPLE ANALYSIS	oil & Grease - 9070	Gross Alpha, Gross Beta	Alcohols, Glycols, & Ketones - 8015	Alcohols, Glycols, & Ketones - 8015 [1-Butanol, Methanol]	See item (1) in Special Instructions					

Sample No.	Matrix *	Sample Date	Sample Time								
10B1	WATER	12.4.00	0700				X	X			
10B2	WATER	12.4.00	0945	X			X	X			
10B3	WATER	12.4.00	1015	X			X	X			
1265	WATER	12.4.00	0945	RT 12.4.00							
1266	WATER	12.4.00	1015								

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
R.Fahlberg	12.4.00 1130	R Thorer	12.4.00 1130
R Thorer	12.4.00 1300	Stored in 2B 3728	12.4.00 1300
Removed from 2B 3728	12.6.00 0900	R Thorer	12.6.00 0900
R Thorer	12.5.00 0900	FED EX	
	12-6-00 0915		12-6-00 0915
	12-7-00 0945		12-7-00 0945

SPECIAL INSTRUCTIONS

(1) VOA - 8260A (App IX); VOA - 8260A (App IX Add-On) [1,1,2-Trichloro-1,2,2-trifluoroethane, 1,3-Butadiene, 1-Butanol, 2-Chloroethyl vinyl ether, Allyl alcohol, cis-1,2-Dichloroethylene, Crotonaldehyde, Dichloropropanol, Diethyl ether, Ethyl acetate, Isoprop

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12/4/00

Matrix *: S=Soil; SE=Sediment; SO=Solid; SL=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WI=Wipe; L=Liquid; V=Vegetation; X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-037-11	Page 1 of 3

Collector: Fahlberg/Johansen	Company Contact: F Roeck; Telephone No.: 372-9086	Project Coordinator: WEISS, RL	Price Code: 7N; Data Turnaround: 45 Days
Project Designation: ERDF Leachate Delisting Analysis	Sampling Location: ERDF	SAF No.: B99-037	Air Quality
Chest No.: RL96-034, 039, 042 (1 of 3, 2 of 3, 3 of 3)	Field Logbook No.: EL 1517-1; COA: RERDF22560	Method of Shipment: Fed EX	
Shipped To: TMA/RECRA RT 12.4.00	Offsite Property No.: A010034	Bill of Lading/Air Bill No.: 4235 7953 - 0967, 0978, 0989	

POSSIBLE SAMPLE HAZARDS/REMARKS: NONE

Special Handling and/or Storage

	None	HCl to pH <2 Cool 4C	Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	Cool 4C	Cool 4C	H2SO4 to pH <2 Cool 4C	HNO3 to pH <2
Preservation	None	HCl to pH <2 Cool 4C	Cool 4C	HNO3 to pH <2	Cool 4C	Cool 4C	Cool 4C	Cool 4C	H2SO4 to pH <2 Cool 4C	HNO3 to pH <2
Type of Container	P	aG	aG	aG	P	P	P	P	P	P
No. of Container(s)	1	1	1	1	1	1	1	1	1	1
Volume	120mL	250mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL	500mL
SAMPLE ANALYSIS	pH (Water) - 9040	TOC - 9060	Carbonyls - 8315 (Formaldehyde)	Mercury - 7470 - (CV)	Conductivity - 9050	See item (1) in Special Instructions	TDS - 160.1	TSS - 160.2	Ammonia - 350.3	See item (2) in Special Instructions

Sample No.	Matrix *	Sample Date	Sample Time										
~~10B1~~	~~WATER~~	~~12.4.00~~	~~0700~~ RT 12.4.00										
10B2	WATER	12.4.00	0945	X	X	X	X	X	X	X	X	X	X
10B3	WATER	12.4.00	1015	X	X	X	X	X	X	X	X	X	X
~~1265~~	~~WATER~~	~~12.4.00~~	~~0945~~	RT 12.4.00									
~~1266~~	~~WATER~~	~~12.4.00~~	~~1015~~										

CHAIN OF POSSESSION	Date/Time	Sign/Print Names Received By	Date/Time
Relinquished By: R Fahlberg	1130 12.4.00	Received By: RThoren	1130 12.4.00
Relinquished By: RThoren	1300 12.4.00	Received By: Stored in RL 2B 3728	1300 12.4.00
Relinquished By: Removed from RL 2B 3726	0400 12.5.00	Received By: RThoren	0400 12.6.00
Relinquished By: RThoren	0400 12.5.00	Received By: FED EX	
Relinquished By: Fed Ex	12-6-00 0915	Received By: [signature]	12-6-00 0915
Relinquished By: Fed Ex	12-7-00 0945	Received By: V. Hendy	12-7-00 0945

SPECIAL INSTRUCTIONS

(1) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate)
(2) ICP Metals - 6010A (TAL): ICP Metals - 6010A (Add-on) (Arsenic, Lead, Selenium, Silicon, Thallium, Tin)

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12/4/00

Matrix *: S=Soil, SE=Sediment, SO=Solid, S=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

EE-011 (10/99)

2 of 3

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-037-11	Page 2 of 6

Collector	Company Contact / Telephone No.	Project Coordinator	Price Code / Data Turnaround
Fahlberg/Johansen	F Roeck 372-9086	WEISS, RL	7N / 45 Days

Project Designation	Sampling Location	SAF No.	Air Quality
ERDF Leachate Delisting Analysis	ERDF	B99-037	

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
RC96-034,039,042 (1 of 3 SAF 3 of 3)	EL 1517-1	RERDF22560	Fed EX

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
TMA/RECRA RT 12.4.00	A0100034	42357453-0967,0978,0984

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

Preservation	HNO3 to pH <2	ZnAc+NaOH to pH >9 Cool	HCl to pH <2	HNO3 to pH <2	NaOH to pH >= 12 Cool 4C	None	Cool 4C EF	Cool 4C IJ	Cool 4C GH	Cool 4C
Type of Container	P	P	P	P	P	P	aG	aG	aG	aG
No. of Container(s)	1	1	1	1	1	1	2	2	2	2
Volume	~~500mL~~ Delete RT 12400	500mL	1000mL Delete RT 12400	~~1000mL~~ Delete RT 12400	1000mL	~~1000mL~~ Delete RT 12400	1000mL	1000mL	1000mL	1000mL

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Total Uranium 12400	Sulfides - 9030	Technetium-99 Delete RT 12400	See item (1) in Special Instructions	Total Cyanide - 9010	Gamma-14 12400	See item (2) in Special Instructions	Chloro-Herbicides - EPA8151	Pest/PCBs - 8081	See item (3) in Special Instructions
~~10B1~~	~~WATER~~	~~12.4.00~~	~~0900~~ RT 12400										
10B2	WATER	12.4.00	0945		X			X		X	X	X	X
10B3	WATER	12.4.00	1015		X			X		X	X	X	X
~~1266~~	~~WATER~~	~~12.4.00~~	~~0945~~										
~~1266~~	~~WATER~~	~~12.4.00~~	~~1015~~ RT 12400										

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
R Fahlberg	12.4.00 1130	R Thorer	12.4.00 1130
R Thorer	12.4.00 1300	Stored in Bldg 2B 3728	12.4.00 1300
Removed from Bldg 2B 3728	12.6.00 0900	R Thorer	12.5.00 0900
R Thorer	12.5.00 0900	FEDEX	
Fed Ex	12.6.00 0915		12-6-00 0915
Fed Ex	12.7.00 0945		12.7.00 0945

SPECIAL INSTRUCTIONS

~~(1) Gamma Spectroscopy (Water) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)~~ RT 12.4.00

(2) 8310_SVOA_HPLC (Benzo(a)anthracene, Benzo(b)fluoranthene, Dibenz[a,h]anthracene)

(3) Semi-VOA - 8270A (App IX): Semi-VOA -- 8270A (App IX Add-On) (1,2-Diphenylhydrazine, 1,4-Dinotrobenzene, 1-Acetyl-2-thiourea, 2,5-Diaminotoluene, 2-Cyclohexyl-4,6-dinitrophenol)

SAMPLES DID NOT ORIGINATE IN RADIOLOGICAL CONTROLLED AREA. NO TOTAL ACTIVITY IS ASSOCIATED WITH SAMPLE /SAMPLES.

RT 12/4/00

Matrix *
S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

EE-011 (10/99)

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: ERDF			DATA PACKAGE: H1173		
VALIDATOR: TCI		LAB: Recra		DATE: 3/9/01	
CASE:			SDG: H1173		

ANALYSES PERFORMED

☒ Anions/IC	☒ TOC	☐ TOX	☐ TPH-418.1	☒ Oil and Grease	Alkalinity
☒ Ammonia	☐ BOD/COD	☐ Chloride	☐ Chromium-VI	☒ pH	☐ NO_3/NO_2
☐ Sulfate	☒ TDS	☐ TKN	☐ Phosphate	☒ TSS	☐
☒ Sulfide	☒ Specific	☐	☐	☐	☐

SAMPLES/MATRIX

B1C0B2 B1C0B3

water

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . Yes (No) N/A

Comments: IC anions 4 days J

pH 4 day J

- CN preservation - undetect - no qual

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

Was initial calibration performed for all applicable analyses?	Yes	No	N/A
Are initial calibration results acceptable?	Yes	No	N/A
Was a calibration check performed for all applicable analyses?	Yes	No	N/A
Are calibration check results acceptable?	Yes	No	N/A

Comments:

4. BLANKS

Were laboratory blanks analyzed?	Yes	No	N/A
Are laboratory blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments: NO FB

5. ACCURACY

Were spike samples analyzed at the required frequency?	Yes	No	N/A
Are spike recoveries acceptable?	Yes	No	N/A
Were LCS analyses performed at the required frequency?	Yes	No	N/A
Are LCS recoveries acceptable?	Yes	No	N/A

Comments:

6. PRECISION

Were laboratory duplicate samples analyzed at the required frequency?	Yes	No	N/A
Are laboratory duplicate sample RPD values acceptable?	Yes	No	N/A
Are field duplicate RPD values acceptable?	Yes	No	N/A
Are field split RPD values acceptable?	Yes	No	N/A

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments: FD TOC(302) TSS (292)

7. ANALYTE QUANTITATION

Was analyte quantitation performed properly? . . . . . Yes No (N/A)

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . (Yes) No N/A

Are results supported in the raw data? . . . . . Yes No (N/A)

Are results calculated properly? . . . . . Yes No (N/A)

Do results meet the CRDLs? . . . . . Yes (No) N/A

Comments: See narrative

Appendix 6

Additional Documentation Requested by Client

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 01/23/01

CLIENT: TNUHANFORD B99-037 H1173 RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-002REP	B110B2	Bromide by IC	12.5 u	12.5 u	NC	50.0
		Chloride by IC	303	301	0.62	50.0
		Fluoride by IC	5.0 u	5.0 u	NC	10.0
		Nitrite by IC	12 u	12 u	NC	50
		Nitrate by IC	260	260	0.68	50
		Phosphate by IC	0.50u	0.50u	NC	2.0
		Sulfate by IC	369	369	0.097	50.0
		Total Organic Carbon	10.8	10.1	6.6	1.0
		Total Dissolved Solids	1500	1900	23.1	1.0
		Total Suspended Solids	5.0 u	5.0 u	NC	1.0
-003REP	B110B3	Cyanide, Total	5.0 u	5.0 u	NC	1.0
		Ammonia, as N	0.10u	0.10u	NC	1.0
		Oil & Grease Gravimetri	4.7	4.5	4.5	1.0
		pH	7.8	7.9	1.9	1.0
		Sulfide	1.0 u	2.0 u	NC	1.0

Recra LabNet - Lionville

INORGANICS DUPLICATE SPIKE REPORT 01/23/01

CLIENT: TNUHANFORD B99-037 H1173 RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	00LIC078-MB1	Bromide by IC	97.8	97.8	0.061
		Chloride by IC	99.2	94.2	5.1
		Fluoride by IC	107.4	101.7	5.4
		Nitrite by IC	98.2	98.7	0.47
		Nitrate by IC	97.1	97.2	0.062
		Phosphate by IC	100.6	102.4	1.7
		Sulfate by IC	96.1	95.7	0.40
BLANK10	00LAM058-MB1	Ammonia, as N	109.0	103.5	5.2
BLANK10	00LOG039-MB1	Oil & Grease - Grav	101.6	96.6	5.1
BLANK10	00LSD057-MB1	Sulfide	100.4	98.8	1.6
BLANK10	00LSP043-MB1	Specific Conductance	99.4	100.2	0.74
BLANK10	00LSS190-MB1	Total Dissolved Solids	100	112.0	11.3

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 01/23/01

CLIENT: TNUHANFORD B99-037 H1173 RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
BLANK10	01LAMB03-MB1	Ammonia, as N	2.1	0.10u	2.0	105.5	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 01/23/01

CLIENT: TNUHANFORD B99-037 H1173 RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	B110B2	Bromide by IC	477	0.00	500	95.4	100
		Chloride by IC	772	303	500	93.7	100
		Fluoride by IC	102	0.40	100	101.9	10.0
		Nitrite by IC	500	12 u	500	100.2	100
		Nitrate by IC	760	260	500	99.1	100
		Cyanide, Total	52	5.0 u	50	103.8	1.0
		Phosphate by IC	9.0	0.50u	10.0	89.5	2.0
		Sulfate by IC	878	369	500	101.9	100
		Total Organic Carbon	15.1	10.8	5.0	86.4	1.0
-003	B110B3	Ammonia, as N	1.8	0.10u	2.0	90.0	1.0
		Sulfide	26.0	0.00	26.7	97.4	1.0
BLANK10	00LIC078-MB1	Bromide by IC	4.9	0.25u	5.0	97.8	1.0
		Bromide by IC MSD	4.9	0.25u	5.0	97.8	1.0
		Chloride by IC	5.0	0.25u	5.0	99.2	1.0
		Chloride by IC MSD	4.7	0.25u	5.0	94.2	1.0
		Fluoride by IC	10.7	0.50u	10.0	107.4	1.0
		Fluoride by IC MSD	10.2	0.50u	10.0	101.7	1.0
		Nitrite by IC	4.9	0.25u	5.0	98.2	1.0
		Nitrite by IC MSD	4.9	0.25u	5.0	98.7	1.0
		Nitrate by IC	4.9	0.25u	5.0	97.1	1.0
		Nitrate by IC MSD	4.9	0.25u	5.0	97.2	1.0
		Phosphate by IC	5.0	0.25u	5.0	100.6	1.0
		Phosphate by IC MSD	5.1	0.25u	5.0	102.4	1.0
		Sulfate by IC	4.8	0.25u	5.0	96.1	1.0
		Sulfate by IC MSD	4.8	0.25u	5.0	95.7	1.0
BLANK10	00LAM058-MB1	Ammonia, as N	1.1	0.10u	1.0	109.0	1.0
		Ammonia, as N MSD	2.1	0.10u	2.0	103.5	1.0
BLANK10	00LTC039-MB1	Total Organic Carbon	5.3	0.50u	5.0	105.6	1.0
BLANK10	00LOG039-MB1	Oil & Grease Gravimetr	50.9	1.0 u	50.1	101.6	1.0
		Oil & Grease - Grav M	39.5	1.0 u	40.9	96.6	1.0
BLANK10	00LSD057-MB1	Sulfide	13.4	1.0 u	13.4	100.4	1.0
		Sulfide MSD	12.0	1.0 u	12.2	98.8	1.0
BLANK10	00LSP043-MB1	Specific Conductance	146	1.0 u	147	99.4	1.0
		Spec Conductance MSD	718	1.0 u	717	100.2	1.0
BLANK10	00LSS190-MB1	Total Dissolved Solids	100	0.00	100	100	1.0
		Total Dissolved Solids	110	0.00	100	112.0	1.0
BLANK10	00LSS191-MB1	Total Suspended Solids	110	0.00	100	106.0	1.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/23/01

CLIENT: TNUHANFORD B99-037 H1173 RECRA LOT #: 0012L502
WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	00LIC078-MB1	Bromide by IC	0.25 u	MG/L	0.25	1.0
		Chloride by IC	0.25 u	MG/L	0.25	1.0
		Fluoride by IC	0.50 u	MG/L	0.50	1.0
		Nitrite by IC	0.25 u	MG/L	0.25	1.0
		Nitrate by IC	0.25 u	MG/L	0.25	1.0
		Phosphate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	0.25 u	MG/L	0.25	1.0
BLANK1	00LC126-MB1	Cyanide, Total	5.0 u	UG/L	5.0	1.0
BLANK10	00LAM058-MB1	Ammonia, as N	0.10 u	MG/L	0.10	1.0
BLANK10	00LTC039-MB1	Total Organic Carbon	0.50 u	MG/L	0.50	1.0
BLANK10	00LOG039-MB1	Oil & Grease Gravimetri	1.0 u	MG/L	1.0	1.0
BLANK10	00LSD057-MB1	Sulfide	1.0 u	MG/L	1.0	1.0
BLANK10	00LSP043-MB1	Specific Conductance	1.0 u	UMHOS/C	1.0	1.0
BLANK10	00LSS190-MB1	Total Dissolved Solids	7.0	MG/L	5.0	1.0
BLANK10	00LSS191-MB1	Total Suspended Solids	5.0	MG/L	5.0	1.0
BLANK10	01LAMB03-MB1	Ammonia, as N	0.10 u	MG/L	0.10	1.0

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B99-037 H1173

DATE RECEIVED: 12/07/00 RFW LOT # :0012L502

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B110B2						
BROMIDE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
BROMIDE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
BROMIDE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
CHLORIDE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
CHLORIDE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
CHLORIDE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
FLUORIDE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
FLUORIDE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
FLUORIDE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRITE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRITE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRITE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRATE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRATE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRATE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
TOTAL CYANIDE	002	W	00LC126	12/04/00	12/14/00	12/14/00
TOTAL CYANIDE	002 MS	W	00LC126	12/04/00	12/14/00	12/14/00
PHOSPHATE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
PHOSPHATE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
PHOSPHATE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
SULFATE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
SULFATE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
SULFATE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
AMMONIA	002	W	00LAM058	12/04/00	12/29/00	12/29/00
TOTAL ORGANIC CARBON	002	W	00LTC039	12/04/00	12/27/00	12/27/00
TOTAL ORGANIC CARBON	002 REP	W	00LTC039	12/04/00	12/27/00	12/27/00
TOTAL ORGANIC CARBON	002 MS	W	00LTC039	12/04/00	12/27/00	12/27/00
OIL & GREASE BY GRAV	002	W	00LOG039	12/04/00	12/16/00	12/17/00
PH	002	W	00LPH100	12/04/00	12/08/00	12/08/00
SULFIDE	002	W	00LSD057	12/04/00	12/08/00	12/08/00
SPECIFIC CONDUCTANCE	002	W	00LSP043	12/04/00	12/11/00	12/11/00
TOTAL DISSOLVED SOLI	002	W	00LSS190	12/04/00	12/08/00	12/11/00
TOTAL DISSOLVED SOLI	002 REP	W	00LSS190	12/04/00	12/08/00	12/11/00
TOTAL SUSPENDED SOLI	002	W	00LSS191	12/04/00	12/11/00	12/11/00
TOTAL SUSPENDED SOLI	002 REP	W	00LSS191	12/04/00	12/11/00	12/11/00

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B99-037 H1173

DATE RECEIVED: 12/07/00 RFW LOT # :0012L502

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B110B3						
BROMIDE BY IC	003	W	00LIC078	12/04/00	12/08/00	12/08/00
CHLORIDE BY IC	003	W	00LIC078	12/04/00	12/08/00	12/08/00
FLUORIDE BY IC	003	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRITE BY IC	003	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRATE BY IC	003	W	00LIC078	12/04/00	12/08/00	12/08/00
TOTAL CYANIDE	003	W	00LC126	12/04/00	12/14/00	12/14/00
TOTAL CYANIDE	003 REP	W	00LC126	12/04/00	12/14/00	12/14/00
PHOSPHATE BY IC	003	W	00LIC078	12/04/00	12/08/00	12/08/00
SULFATE BY IC	003	W	00LIC078	12/04/00	12/08/00	12/08/00
AMMONIA	003	W	00LAM058	12/04/00	12/29/00	12/29/00
AMMONIA	003 REP	W	01LAMB03	12/04/00	01/17/01	01/18/01
AMMONIA	003 MS	W	01LAMB03	12/04/00	01/17/01	01/18/01
TOTAL ORGANIC CARBON	003	W	00LTC039	12/04/00	12/27/00	12/27/00
OIL & GREASE BY GRAV	003	W	00LOG039	12/04/00	12/16/00	12/17/00
OIL AND GREASE BY GR	003 REP	W	00LOG039	12/04/00	12/16/00	12/17/00
PH	003	W	00LPH100	12/04/00	12/08/00	12/08/00
PH	003 REP	W	01LPH004	12/04/00	01/15/01	01/15/01
SULFIDE	003	W	00LSD057	12/04/00	12/08/00	12/08/00
SULFIDE	003 REP	W	00LSD057	12/04/00	12/08/00	12/08/00
SULFIDE	003 MS	W	00LSD057	12/04/00	12/08/00	12/08/00
SPECIFIC CONDUCTANCE	003	W	00LSP043	12/04/00	12/11/00	12/11/00
TOTAL DISSOLVED SOLI	003	W	00LSS190	12/04/00	12/08/00	12/11/00
TOTAL SUSPENDED SOLI	003	W	00LSS191	12/04/00	12/11/00	12/11/00
LAB QC:						
BROMIDE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
BROMIDE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
BROMIDE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
CHLORIDE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
CHLORIDE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
CHLORIDE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
FLUORIDE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
FLUORIDE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
FLUORIDE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00

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Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B99-037 H1173

DATE RECEIVED: 12/07/00 RFW LOT # :0012L502

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NITRITE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
NITRITE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
NITRITE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
NITRATE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
NITRATE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
NITRATE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
TOTAL CYANIDE	LCS L	W	00LC126	N/A	12/14/00	12/14/00
TOTAL CYANIDE	LCS L	W	00LC126	N/A	12/14/00	12/14/00
TOTAL CYANIDE	MB1	W	00LC126	N/A	12/14/00	12/14/00
PHOSPHATE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
PHOSPHATE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
PHOSPHATE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
SULFATE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
SULFATE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
SULFATE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
AMMONIA	MB1	W	00LAM058	N/A	12/29/00	12/29/00
AMMONIA	MB1 BS	W	00LAM058	N/A	12/29/00	12/29/00
AMMONIA	MB1 BSD	W	00LAM058	N/A	12/29/00	12/29/00
TOTAL ORGANIC CARBON	MB1	W	00LTC039	N/A	12/27/00	12/27/00
TOTAL ORGANIC CARBON	MB1 BS	W	00LTC039	N/A	12/27/00	12/27/00
OIL & GREASE BY GRAV	MB1	W	00LOG039	N/A	12/16/00	12/17/00
OIL AND GREASE BY GR	MB1 BS	W	00LOG039	N/A	12/16/00	12/17/00
OIL AND GREASE BY GR	MB1 BSD	W	00LOG039	N/A	12/16/00	12/17/00
SULFIDE	MB1	W	00LSD057	N/A	12/08/00	12/08/00
SULFIDE	MB1 BS	W	00LSD057	N/A	12/08/00	12/08/00
SULFIDE	MB1 BSD	W	00LSD057	N/A	12/08/00	12/08/00
SPECIFIC CONDUCTANCE	MB1	W	00LSP043	N/A	12/11/00	12/11/00
SPECIFIC CONDUCTANCE	MB1 BS	W	00LSP043	N/A	12/11/00	12/11/00
SPECIFIC CONDUCTANCE	MB1 BSD	W	00LSP043	N/A	12/11/00	12/11/00
TOTAL DISSOLVED SOLI	MB1	W	00LSS190	N/A	12/08/00	12/11/00
TOTAL DISSOLVED SOLI	MB1 BS	W	00LSS190	N/A	12/08/00	12/11/00
TOTAL DISSOLVED SOLI	MB1 BSD	W	00LSS190	N/A	12/08/00	12/11/00
TOTAL SUSPENDED SOLI	MB1	W	00LSS191	N/A	12/11/00	12/11/00
TOTAL SUSPENDED SOLI	MB1 BS	W	00LSS191	N/A	12/11/00	12/11/00
AMMONIA	MB1	W	01LAMB03	N/A	01/17/01	01/18/01
AMMONIA	MB1 BS	W	01LAMB03	N/A	01/17/01	01/18/01

Duncan, Jeanette M

To: bchristian@techlawinc.com
Subject: ERDF Comment Disposition

Bruce,

Received your comment disposition for H1173 (ERDF). Rich has reviewed this and says that you didn't disposition the following comments:

Rich's comment for page 10 of the Wet Chemistry: No J qualifier applied to TDS of TSS. Should be applied to TDS values.

Claude's comment #3 for Volatiles: Page 004, Field Duplicate samples refers to the sample numbers as B103K7/B103K8. The samples should be B110B2 & B110B3.

Could you fix and send me appropriate pages?

Thanks,

Jeanette

Review Comment Record (RCR)

1. Date	2. Review No.
03/20/01	QA01-005
3. Project	4. Page
ERDF Leachate	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H1173	ERDF Leachate Delisting Analysis	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact Date

Author/Originator

11. CLOSED

04/11/01

Reviewer/Point of Contact Date

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Semivolatiles: OK.			
2	Volatiles: Page 001, Note 1 indicates the analysis was ran by EPA 8260B, whereas, the laboratory narrative indicates the analysis was ran by EPA 8260A. This may be an error in the laboratory narrative since the last ERDF sample indicated they were using 8260B.			
3	Volatiles: Page 004, Field Duplicate Samples refers to the sample numbers as B103K7/B103K8. Should be B110B2/B110B3.			
4	Volatiles: The revised pages 011 and 012 need numbered.			
5	Wet Chemistry: Page 010, samples are identified as B110B1 and B110B2. The samples should be B110B2 and B110B3.			
6	Wet Chemistry: The report needs to note that the CN samples did not indicate proper preservation when received at the laboratory. Even though the sample bottles indicated NAOH added the samples were not at a pH of >12 when received at the laboratory there needs to be reference to this fact in the report. Especially since the results are less then reporting limits.			
7	PCBs, Pesticides, Herbicides: Page 3, Field Duplicate Samples has the samples as B110B3/B110B3. This should be B110B2/B110B3.			
8	Inorganic: OK			

Review Comment Record (RCR)

1. Date	2. Review No.
03/20/01	QA01-005
3. Project	**4. Page**
ERDF Leachate	Page 2 of 1

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
9	RadChem: Page 1 Sample ID for samples B110B2 and B110B3 is wrong, and Page 3 under Field Duplicate Samples same thing. Also for sample B11266 in the Analysis column should only have note 2.			
10				
11				

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 25 March 2001

Information Request #1

H1173

Claudes RCR comments:

Ran specifically due to COC

#2 - volatiles. I'm going to need the lab to confirm which analysis it ran 8260A or 8260B?

#4 - volatiles. My pages 11 an 12 have numbers and I don't see anything in Claudes comments that would indicate they need a revision.

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 25 March 2001

Information Request #1

H1173

Claudes RCR comments:

#2 - volatiles. I'm going to need the lab to confirm which analysis it ran. 8260A or 8260B?

#4 - volatiles. My pages 11 an 12 have numbers and I don't see anything in Claudes comments that would indicate they need a revision.

Review Comment Record (RCR)

1. Date	2. Review No.
03/20/01	QA01-005
3. Project	4. Page
ERDF Leachate	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H1173	ERDF Leachate Delisting Analysis	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) _____ Date _____

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

11. CLOSED

Reviewer/Point of Contact _____ Date _____

Author/Originator _____

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Semivolatiles: OK.			
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4	Volatiles: The revised pages 011 and 012 need numbered.			
5	Wet Chemistry: Page 010, samples are identified as B110B1 and B110B2. The samples should be B110B2 and B110B3.			
6	Wet Chemistry: The report needs to note that the CN samples did not indicate proper preservation when received at the laboratory. Even though the sample bottles indicated NAOH added the samples were not at a pH of >12 when received at the laboratory there needs to be reference to this fact in the report. Especially since the results are less then reporting limits.			
7	PCBs, Pesticides, Herbicides: Page 3, Field Duplicate Samples has the samples as B110B3/B110B3. This should be B110B2/B110B3.			
8	Inorganic: OK			

Review Comment Record (RCR)

1. Date	2. Review No.
03/20/01	QA01-005
3. Project	4. Page
ERDF Leachate	Page 2 of 1

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
9	RadChem: Page 1 Sample ID for samples B110B2 and B110B3 is wrong, and Page 3 under Field Duplicate Samples same thing. Also for sample B11266 in the Analysis column should only have note 2.			
10				
11				

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Tuesday, March 20, 2001 12:59 PM
To: Duncan, Jeanette M
Subject: review of Validation Package for SDG H1173

Jeanette,

Comments on the validation package are as follows:

Wet Chemistry: pg 8 & 11; shows "J" qualification of total suspended solids. From the validation narrative, this should be for total dissolved solids (note total suspended solids were non-detect, no RPD could be calculated).
pg 10: No "J" qualifier applied to either TDS or TSS. Should be applied to TDS values.

All other sections - No Comment

Let me know if you have any questions.

Rich

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Tuesday, March 20, 2001 12:59 PM
To: Duncan, Jeanette M
Subject: review of Validation Package for SDG H1173

Jeanette,

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pg 10: No "J" qualifier applied to either TDS or TSS. Should be applied to TDS values.

All other sections - No Comment

Let me know if you have any questions.

Rich

No Completed